INDIAN DEFENCE PROGRAM 1964-78

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This thesis is my own original work.

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INTRODUCTION

As a consequence of the Sino-Indian conflict of 1962, the Government of India realised the need for cohesive long term planning of defence requirements and this resulted in the First National Defence Plan, formulated and announced in 1964, to be implemented over a period of five years. The expenditure on defence increased from Rs.3,310 million in 1961-62 to Rs.8,060 million in 1964-65 and Rs.15,250 million in 1971-72, to its present (1977-78) level of Rs.27,520 million.[1] Also, within a decade after the 1962 conflict, India was involved in two major wars with Pakistan (1965 and 1971).

Despite these significant events, there exists virtually no study of Indian defence policies during the post-1962 period,[2] nor, in a narrow context, any study of the defence reorganisation, expansion and modernisation program that was undertaken from 1964 onwards. The aim of this thesis is to attempt the latter task. It shall

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[1] India - 1977 & 78 (Delhi: Publications Division, Govt. of India, 1978), p.41. All figures are in current Rupees and the expenditure for 1977-78 is based on budget estimates.

[2] Work has, however, been done on the 1947-62 period by Lorne J. Kavic, The Formation and Execution of Indian Defence Policy 1947-62, Ph.D Thesis, Australian National University, 1966. Later published as India's Quest for Security: Defence Policies 1947-1965 (Berkeley and Los Angeles: University of California Press, 1967).

seek to make an overall survey of the changes that have taken place in the Indian defence structure i.e. the defence forces as well as the defence production units, during the 1964-1978 period. No attempt will be made to go into the broader policy aspects of strategic threat perception or defence and foreign policy planning.

The study is divided into five Chapters:

Chapter I: Defence Planning 1964-78

This Chapter will attempt to evaluate Indian weapons procurement and financial policy planning right from its formal inception in 1964. An effort will be made to find out whether:

1. there has been any consistency in planning or the basic rule has been one of ad hoc decisions cloaked as defence plans.
2. the bureaucratic decision-making structure and personnel policies have increased in efficiency over the years.
3. there was a consistent effort to expand and integrate the defence industrial base with the civil industrial sector, keeping in view the long term requirements. Whether attempts at increasing self-sufficiency were guided by motives of prestige or whether they represented an effort to lessen dependence on rather unreliable suppliers wherein political considerations tended to predominate.

In other words, an attempt will be made to provide the background for subsequent discussion regarding the expansion and increasing sophistication of the armed forces.

Chapter II: Indian Army 1964-78

The first Defence Plan envisaged an expansion of the Army to a well equipped force of twenty one divisions including four or five divisions with smaller establishments capable of expansion in an emergency. Ten of these divisions were to be mountain divisions specially equipped, organised and trained for operations in the Himalayan region. This force level was determined by the possibility of having to fight a simultaneous war with China and Pakistan.

Consequently, this Chapter will deal with the expansion, weapons acquisition and the politics thereof, during the period under study.

Chapter III: Indian Navy 1964-78

This branch of the Indian armed forces was relatively slow to modernise in the 1960s due to

1. strategic threat perception
2. financial constraints and possibly
3. its lack of participation in actual hostilities.

The role of the Navy in the 1971 war resulted in changes in the above mentioned factors and this decade is witnessing a sustained program of naval development. This will be examined and conclusions drawn as regards the kind of future role that the naval expansion seems to envisage.

Chapter IV: Indian Air Force 1964-78

From a conglomeration of aircraft (e.g. Mysteres, Toofanis and Vampires etc.) the Air Force has developed into a 'well balanced' force of 45 Squadrons capable of providing tactical air support to the ground forces as well as conducting bombing missions inside enemy territory. For political and financial reasons, so far Soviet aircraft have tended to predominate in its inventory. There has also been a domestic contribution to its strength in the form of HF-24, Gnats and French helicopters manufactured under licence.

This Chapter will thus be a survey of the development of the Indian Air Force.

Chapter V: Defence Production 1964-78

The early 1960s witnessed attempts at acquiring self-sufficiency in small arms and ammunition by developing the domestic defence production base and increasing investment in Defence Research and Development. Collaborative agreeements for the manufacture of sophisticated items like aircraft, frigates and missiles were sought and achieved, resulting in a modestly expanding domestic self-sufficiency. But the questions which arise and attempt will be made to answer:

1. how much self-sufficiency has been attained and at what cost?
2. has the increasing expenditure on Defence R & D resulted in any worthwhile achievements or have

the successes been more the result of collaborative joint ventures?

3. has any attempt been made to harness the capacity of the civil industrial sector, and on the other hand, how much of production in the defence production units is for defence purposes?

Assessment:

In view of the discussion of its various aspects an effort will be made to make an overall assessment of the defence program during the 1964-78 period.

CHAPTER I

DEFENCE PLANNING 1964-78

The Decision-Making Structure:

The Indian defence decision-making machinery evolved largely ad hoc after independence.[1] At the apex was the Defence Committee of the Cabinet with the Prime Minister (who was also the Minister of External Affairs) as Chairman. Other members included the Home, Finance and Defence Ministers with other ministers co-opted from time to time. The heads of the three Services, the Secretary, Ministry of Defence and the Financial Adviser (Defence) would also be present at the meetings of the Committee.[2]

However, following the Sino-Indian conflict of 1962, the Defence Committee of the Cabinet was replaced by one called the Emergency Committee of the Cabinet. The main difference in this new Committee was that the Chiefs of Staff and the Defence Secretary were no longer present at the meetings. At the same time a number of new committees came into existence in 1963, mainly entrusted with the task of accelerating the defence buildup. But soon

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[1] For a detailed account of the evolution of the decision-making structure during the 1947-62 period see Nagendra Singh, The Defence Mechanism of the Modern State, (London: Asia Publishing House, 1964), pp.162-174.

[2] ibid., p.172.

afterwards, as the Chinese threat receded, 'these committees became gradually circumscribed in power and ultimately disappeared'.[3]

The Ministry of Defence is characterised by a network of committees established at various levels.[4] At the top, and acting on behalf of the Defence Committee of the Cabinet, is the Defence Minister's Committee. This is headed by the Defence Minister and includes junior Ministers, the three Service Chiefs, the Defence Secretary, Secretary, Department of Defence Production, the Scientific Adviser to the Minister of Defence and the Financial Adviser (Defence).

This Committee has two Sub-Committees viz. Principal Personnel Officers Committee and Principal Supply Officers Committee which consist of representatives of the Ministry of Finance (Defence), Ministry of Defence and the Services Headquarters. These are headed by the most senior Service representative on a rotation basis and their recommendations are considered by the Chiefs of Staff Committee before being submitted to the Defence Minister's Committee. The Chiefs of Staff Committee comprises the three Service Chiefs with the member who has been longest on the Committee as Chairman.

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[3] P.V.R. Rao, Defence Without Drift, (Bombay: Popular Prakashan, 1970), p.309.

[4] The organisation of the Ministry of Defence has remained largely unchanged since 1964-65 and information on this has been derived from Defence Services Estimates 1977-78 (Govt. of India, 1977), pp.93-96.

Besides, there are two more departments in the Ministry of Defence: (1) Department of Defence Production which controls the chain of Ordnance Factories in the country as well as the nine Defence Public Sector Undertakings, and, (2) Department of Defence Supplies. This was created in 1965 and deals with the indigenous development and production of items that were previously imported or are being introduced for the first time, as well as seeking to supplement the capacity of the Ordnance Factories. Operating through a number of Technical Committees, this department is entrusted with the task of adapting existing facilities both in the public as well as private sectors to meet defence requirements.

These two departments come under the purview of the Defence Ministers' (Production and Supply) Committee which consists of all the members of the Defence Ministers' Committee as well as Additional Secretary, Department of Defence Supplies, Additional Secretary, Ministry of Defence, the Director General of Inspection and the Director General of Ordnance Factories. There is also an inter-ministerial body, the Defence Production Board constituted in May, 1974, which oversees and takes decisions in respect of the Ordnance Factories. The Board has the Secretary (Defence Production) as its Chairman and representatives of the Departments of Economic Affairs, Expenditure, Defence Supplies, Defence and Industrial Development as Members.

The Defence Research and Development Council, with the Defence Minister as Chairman is responsible for policy formulation and coordination of Defence R & D.

With regard to financial control, there is a separate Division of the Ministry of Finance for dealing with all matters of the Ministry of Defence concerned with finance. The head of this Division is the Financial Adviser (Defence) who is responsible to the Minister of Finance. No expenditure can be authorised without the concurrence of the Financial Adviser or his representative. The Financial Adviser also attends meetings of all Committees dealing with defence matters and financial concurrence is generally accorded in three stages: (1) an examination of the proposal, (2) assessment of its financial implications and (3) if accepted, an examination and vetting of the final orders before issue. This process thereby ensures close control by the Finance Ministry. The Financial Adviser is also the Chief Accounting Officer for the Defence Services. He prepares the Budget and other estimates, and is ultimately responsible for internal audit although this responsibility is discharged through the Controller General of Defence Accounts.

Functioning under the administrative control of the Ministry of Finance (Defence Division), the Defence Accounts Department with the Controller General of Defence Accounts at its head, has an organisational structure broadly corresponding to the organisation of the three services. Thus, there is a Controller of Defence Accounts for each of the Commands in the case of the Army while the Navy and Air Force have their separate Controllers of Defence Accounts.

The above description of the rather formidable number of interlocking, sometimes overlapping, committees would suggest that all aspects of defence - policies, planning and production would receive extensive and critical attention at various levels before submission to the Cabinet or its subcommittee. But any attempt at evaluating the planning process faces the problem of lack of information. The Ministry of Defence discloses no details of the financial outlays or the intended purchases of weapons systems under the various plans. Neither is there any information available on the strategic planning methods. To add to this, public interest in defence matters has never been very intense. This is especially true of the 1970s wherein there has been hardly any debate on problems of defence.

Nonetheless, an attempt is made below to evaluate the performance of the Indian defence planners in the fields of equipment procurement and financial policy-making on the basis of the rather scanty information provided in the Annual Reports of the Ministry of Defence.

The Defence Plans:

In an attempt to build up Indian defences after the Sino-Indian conflict of 1962, the Government formulated a Defence Plan in 1963-64 which envisaged:

(a) the buildup and maintenance of a well equipped Army with a sanctioned strength of 825,000 men.

(b) modernisation and maintenance of a 45 Squadron Air Force including the improvement of air defence radar and communication systems.

(c) a program for the replacement of over-age ships of the Navy.

(d) improvement of road communications in border areas.

(e) strengthening the defence production base.[5]

The Plan involved a financial outlay of Rs.50 billion including expenditure on expansion, modernisation and maintenance.[6] However, this program was not based on any long term requirements plan but was just an attempt at defining objectives and requirements. The expenditure involved was just the sum total of the estimated yearly budgets over a five year period[7] i.e. an outlay of Rs.10 billion per year.

Moreover, the program involved a substantial degree of foreign assistance both in terms of technical know how and material and financial aid. It was in this context that the then Defence Minister, Y.B. Chavan visited U.K., U.S.A. and U.S.S.R. in 1964-65. The trips were reasonably successful. The Soviet Union agreed to equip three MiG squadrons besides providing facilities for their manufacture, some light tanks and miscellaneous equipment.

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5 Report 1964-65, pp.1-2.

6 ibid., p.2.

7 Report 1969-70, pp.6-7.

Britain decided to provide a loan for the indigenous manufacture of Leander Class frigates and also agreed in principle to provide facilities for the manufacture of a submarine for the Indian Navy. The United States agreed to supply various types of equipment besides assisting in setting up an Ordnance Factory.[8]

However, before much could be achieved, the modernisation program was interrupted because of the Indo-Pakistan war in 1965 and the subsequent embargo placed by the U.S. and the U.K. Not only did military aid and assistance cease but the creation of new production capacities also suffered a setback since these too were dependent to some extent, on procurement of supplies from abroad, especially from the two abovementioned countries. Another factor which impeded progress was that, apart from the cost of the war, the increase in defence spending was already having its effects on the country's economy. Resources had to be directed from the already restricted Development Plan funds and the States were reported to have been told by the Central Government that they would have to raise their own resources.[9] Also, three emergency mobilisation schemes to raise additional finance were announced. These were in

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[8] Report 1964-65, p.2. This aspect is discussed at length in later Chapters.

[9] The then Deputy Chairman of the Planning Commission, Ashok Mehta pointed out in November, 1965 that resources for the Development Plan programs in 1966-67 would be only a little over Rs.19 billion (even less than the modest Rs.20.8 billion that had been tentatively agreed) as compared to Rs.22.5 billion for 1965-66. See Times of India, September 3, October 19 and November 17, 1965.

the form of National Defence Loans, 15 Year Gold Bonds and a scheme to encourage foreign exchange remittances from Indians living abroad.[10]

At its meeting on September 5-6, 1965, the National Development Council authorised the Chairman of the Planning Commission to review the Development Plans, and a planning cell was set up at the Ministry of Defence in November 1965 to ensure that those elements of the Development Plans that had a bearing on defence were given 'appropriate priorities'.[11] A new Department of Defence Supplies was created to locate indigenous sources for the manufacture of defence equipment that was hitherto imported.[12] The Department was also entrusted with the task of developing the electronics industry in the country.[13] The Planning Commission also set up 9 technical Study Groups consisting of representatives of the Department of Defence Production[14] and other concerned Ministries to suggest measures to give a defence orientation to various sectors of industry.[15]

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[10] Times of India, October 20, 1965.

[11] Report 1965-66, p.6.

[12] ibid., p.5.

[13] Report 1970-71, p.87. In 1970 this work was transferred to the Cabinet Secretariat.

[14] This department was itself a relatively new establishment, having been formed barely 3 years ago, in November, 1962. See A.L. Venkateshwaran, Defence Organisation in India (Govt. of India Publications Division, 1967), p.301.

[15] These were: aeronautics, electronics, shipbuilding, alloy and special steels, explosives and chemicals, textiles and general stores, instrumentation, non-ferrous metals and alloys, vehicles and engineering equipment. See Report 1965-66 , p.65. Also, Times of India, December 7, 1965.

Thus, the events of 1965-66 had a threefold effect:

(a) the implementation of the defence plan was delayed because of both the cessation of assistance from abroad and economic difficulties at home. The latter, while not impinging upon aims, did rather inflate the costs.

(b) they gave an added impetus towards indigenisation and self reliance. Greater emphasis was laid on Defence R & D and as is discussed later, concerted efforts at import substitution were attempted.

(c) due to diversion of resources from the development plan funds,[16] industrial development suffered a setback, which, in the long run, would also affect the attempts at attaining self-sufficiency in the manufacture of defence equipment.

Consequently, implementation of the first Defence Plan would seem to have proceeded in a rather haphazard and erratic manner. Against a total outlay of Rs.50 billion that had been envisaged, the actual expenditure in the 1964-69 period amounted to Rs.46 billion (approx.).[17] This would suggest that modernisation of the armed forces

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[16] As a result, the fourth Five Year Development Plan, originally scheduled to commence in 1966 was postponed for three years. See Wing Cdr. Maharaj K. Chopra, 'India on the Eve of the Second Defense Plan', Military Review, January 1969, p.6.

[17] Indian Defence Budget 1972-73: A Seminar Report Institute for Defence Studies and Analyses Journal, Vol.4, No.4, April 1972, p.434.

was delayed not because of lack of resources, but due to difficulties in the procurement of equipment from abroad. This in turn also had adverse effects on domestic defence production.

It was only from 1969 onwards i.e. with the (second) 1969-74 Defence Plan that efforts at long term perspective planning were initiated. Although no details of what the plan envisaged or the financial outlay involved were disclosed, it was stated that changes in strategic requirements and tactical concepts had been incorporated. Based on a ten-year forecast of requirements, the Rupee and foreign exchange requirements for the plan period had been assessed and assurance obtained from the Government that they would be available as per plan. In an attempt to encourage the three Services to be cost effective, allocations were made for the entire period of five years.[18]

The decision-making process at the Ministry of Defence was also updated with the incorporation of modern management techniques like systems analysis, operations research value engineering, project management and the use of computers.[19] Nevertheless, the planning process would still seem to have been rather narrow in its focus and very susceptible to any unforeseen circumstances. This is because, as events of later years showed, there is no

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[18] Report 1969-70, p.7.

[19] Report 1970-71, p.8.

evidence of any sort of contingency planning. Besides, the picture that emerges is that of a new plan being formulated almost every year. The very next year, in 1970-71, it was announced that the planning process had been modified slightly in that, the defence plan would now be based on the 'Roll-On' concept.[20] There would be an annual review of the plan and another year added to replace the one that had just lapsed. In other words, there would always be a five year plan at any given point of time.

The long term objective behind the formulation of defence plan during this period were twofold:

(a) to acquire weapons technologies along with weapons systems. If this was not possible, the emphasis was to be on the development of support facilities such as the manufacture of spares, ammunition, overhaul and repair facilities.[21]

(b) that the future approach to defence production would be increasingly technology oriented rather than product oriented, as had been the case earlier A composite plan for the development of science and technology was sought to be formulated.[22]

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[20] ibid., p.7.

[21] Report 1971-72, p.19. The second alternative would be particularly relevant to acquisitions from the Soviet Union wherein there is no evidence of the latter's willingness to provide technology along with weapons.

[22] ibid., p.22.

These objectives by themselves did not represent any radical or innovative change in Indian defence planning. On the other hand they amounted to a restatement of decisions made during the first plan period.

Implementation of the Roll-On Plan was disrupted a year after its formulation due to the 1971 war. Because of the crisis, it was officially stated, 'certain imbalances in crucial areas had to be made good rapidly ... priorities had to be varied and earlier plans telescoped. It was not found possible to adhere fully to the discipline and the pattern of the Roll-On Plan'.[23] This amounted to a virtual admission of the fact that in defence planning there was no provision for any contingencies whatsoever, because the situation took quite some time to build up to crisis proportions and the subsequent outbreak of war. Events of the remaining period of the plan i.e. 1972-1974 also tend to confirm this conclusion. It was decided to correlate the Defence plans for the remaining years with the annual budgets of the Central Government.[24] This situation would seem to be a repetition of the first plan period wherein planning was an exercise that amounted to the formulation of yearly budgets.

Preparations for the formulation of the next (1974-79) Roll-On Plan were also strongly reminiscent of the period of the preparation of the 1969-74 Plan. A Planning Group

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23 Report 1971-72, p.20.

24 Report 1972-73, p.10.

was set up in 1973-74 to make recommendations for the Defence Plan,[25] which, it was announced, would be co-terminous with the 5th Five-Year Development Plan.[26] The priorities set forth in their proposals were, however, reviewed a few months later because of both the increase in oil prices and inflation in the domestic economy. In its usual vague manner, the Ministry of Defence announced in 1975 that it had also been decided to keep the Plan 'flexible and adaptable to changes in the pattern of international relationships, the strategic and tactical concepts and changes in technology'.[27] This would seem to be an admission of the fact that the planners had yet to develop the necessary expertise/ competence in defence planning based on long term requirements.

One reason given for these revision exercises was the fact that, given the intention to develop a substantial defence production base, plans had to be formulated under severe financial ceilings and budgetary constraints.[28] But then, the financial handicap would not be an unforeseen factor in the Indian context. Also, the fact remains that

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[25] Report 1974-75, p.6.

[26] The 1969-74 Defence Plan had also been originally envisaged as being co-terminous with the 4th Five-Year Development Plan.

[27] Report 1974-75, p.7.

[28] ibid., p.12.

the 1974-79 Defence Plan seems to have undergone substantial revision quite frequently ever since its inception. As mentioned earlier, the recommendations of the planning group had been reviewed a few months after they had been made, in 1974. In 1975, the reason given was that of large scale acquisition of military hardware by 'neighbours'.[29] The situation was reviewed again in April 1976 with the intention of preparing a Roll-On Plan for 1976-81. Instead, it was decided to consider new schemes for the 1974-79 plan.[30] This admission reveals some kind of ambiguity in planning since both the 1974-79 as well as the 1976-81 plans are supposed to be based on the Roll-On concept. Various reasons were given for this action, in that this had become necessary because of earlier omissions, cost escalations and the higher cost of production in indigenous industry.[31]

Conclusions:

As can be inferred from the above account, defence planning in India has been based on a series of ad hoc measures. Although it was officially conceded that the First (1964-69) Plan was no plan at all in the real sense of the term, the planning process does not seem to have undergone a very substantial change in later years either.

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29 Report 1976-77, p.4.

30 Report 1977-78, p.5.

31 ibid.

The problems faced in the 1964-69 period are understandable. It was the first time after independence that the question of defence had reviewed serious attention. Shortly afterwards came the embargoes by the Western Powers in 1965. The consequence was a serious reconsideration of the implied reliance on the West that had been envisaged earlier. There was also the problem of diverting resources to finance defence requirements.

Even then, there is not much evidence to support the argument that there was an overall attempt after 1965 to gear the economy towards self reliance in defence. As a former Secretary of the Ministry of Defence has observed, a certain amount was done to align industrial development to defence requirements 'but it was generally mainly in bits and pieces, not as an integrated national industries plan'.[32] In other words, industries related directly to defence (e.g. ordnance factories) were strengthened but there was no attempt at the development of the civil industrial sector as part of a comprehensive effort.

Defence Research and Development began to be emphasised only after the events of 1965-66. But, the problem here again was one of attempting to develop competence without taking into account the capacity and capability of the industrial infrastructure. More often than not, there have been cases where various items of equipment were developed and it was discovered only later that there was no

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[32] S.S. Khera, India's Defence Problems (New Delhi: Orient Longmans, 1968), p.261.

manufacturer competent to take up production on a large scale.[33] It is only recently that some attempts are being made to ensure cooperation between Defence R & D establishments and the prospective manufacturers from the very initial stages of development of various items.

Even a superficial survey of the planning attempts from 1969 onwards shows the disorganised nature of defence planning. Plans seem to undergo drastic revision nearly every year if not more frequently. Although, at least in theory, the Roll-On concept in planning was introduced as early as 1970, the 1969-74 plan itself had to be more or less given up after the 1971 war. What followed was a three year period during which all planning amounted to the formulation of yearly budgets. This was a situation strongly reminiscent of the 1960s. Still later, much was made of the 1974-79 plan in that it was to be implemented along with the development plan for the period i.e. there was an attempt at correlating defence and development. But the plan seems to have needed frequent revisions ever since its inception.

Another interesting aspect of planning from 1974 onwards, is that in practice, the roll-on concept seems to have been abandoned. This is because, as mentioned earlier, a review in 1976 to prepare the 1976-81 Roll-On Plan resulted in new schemes being included in the 1974-79 plan. Thus, it would be very difficult to visualise a multiplicity of

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[33] Defence R & D is discussed in detail in the Chapter on Defence Production.

roll-on plans being implemented simultaneously. This would have to be the case if it was accepted that both the 1974-79 as well as the 1976-81 plans were based on the roll-on concept.

The only conclusion that could then be drawn from the above is that defence planning still proceeds on a year-to-year basis. Although there has been some improvement over the last decade, in that there are assured resources, and modern management techniques have been adopted, much still remains to be achieved. Decision-makers would still seem to have a lot to learn before they develop the degree of competence that is essential for long term forecasting and planning.

There are many reasons which are responsible for the frequent changes that characterise the course of Indian defence planning. The system of staffing in the Ministry of Defence does not provide for the development of expertise among decision-makers. In the words of a former Defence Ministry official:

> ... emphasis is on the tenure system, evolved in the pre-independence days, which is based on the presumption that an intelligent generalist should be able to tackle almost any secretariat post ... the tendency is to rely on the recommendations of the Services ... and try to fit them into certain predetermined budgetary ceilings.[34]

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[34] K. Subrahmanyam, 'Academic Contribution to National Security Policy Formulation in India', Institute for Defence Studies and Analyses Journal, Vol.1, No.2, January 1969, p.88.

This implies that decision-making is predominantly the domain of the senior officers of the three Services with their civilian counterparts having only a secondary role in the process. Also, the inevitable consequence of this would be that any discontinuity in the recommendations of the Services Headquarters would ultimately be reflected in the decisions taken by the Government.

Another problem in this context that still persists is the lack of interaction between the decision-makers of the Ministry of Defence and academic institutions. Added to this is the fact that International Relations in general and Strategic Studies in particular, are fields that are not well developed in Indian Universities or other institutions.[35] Consequently, there is not much of external input, both in terms of talent or ideas in defence decision-making.[36]

Lastly, over the years, there has been virtually no public debate on any aspect of national security or defence planning. A major contributing factor in this regard has

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[35] For example, the Jawaharlal Nehru University, New Delhi and Jadavpur University of Calcutta are the only two institutions that have full fledged departments of International Relations. A few other universities run area study centers or offer courses in what is termed 'military science'. The Institute for Defence Studies and Analyses at New Delhi which was created a decade ago with the intention of developing expertise on defence and strategic issues has not been able to live upto expectations either.

[36] K. Subrahmanyam, n.30, p.92.

been the fact that no level of the defence decision-making process is open to any form of scrutiny by the public or even by Parliament.[37] Reasons of National Security is the blanket excuse that has inevitably been used by the Government in its refusal to disclose any information that might open it to criticism.

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[37] For a good study of the ineffective role of the Parliament in matters related to defence problems see Cecil B. Jones Jr., How the Indian Lok Sabha Handles Defense Matters - An Institutional Study, Ph.D Thesis (Unpublished), The American University, 1975.

CHAPTER II

INDIAN ARMY 1964-78

Until 1962, contingency planning for the Army was based on the assumption that India would not have to fight a simultaneous war with China and Pakistan.[1] This perception, however, changed after the Sino-Indian conflict of 1962 and it was decided to raise the strength of the Army from about 350,000[2] to 825,000.[3] The Army was conceived as a well-equipped force of about twenty-one divisions including four infantry divisions on a reduced establishment, capable of expansion at short notice.[4] Ten of these divisions would be mountain divisions, as self-contained as possible, with emphasis on increased fire-power and mobility.

The bulk of the recruitment of officers and men had been com!leted by 1964-65, except for some shortages persisting in certain technical branches.[5] About 9,000 officers had been granted Emergency Commissions (EC) since November 1962,[6] with the last of the EC courses passing

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1 Lorne J. Kavic, India's Quest for Security: Defence Policies, 1947-1965 (Berkeley and Los Angeles: University of California Press, 1967), p.88.

2 ibid., p.97.

3 India. Ministry of Defence, Report 1964-65, p.1. (Hereafter referred to as Report).

4 Lorne J. Kavic, n.1, p.194.

5 Report 1964-65, p.17.

6 ibid., p.19.

out from the Indian Military Academy (IMA), Dehradun, and the Officers Training School (OTS), Madras, in October, 1964 and April, 1965 respectively. The OTS at Poona which had been established for training EC officers was closed down in July 1964 and regular courses for Permanent Commissioned officers were re-introduced at the IMA, while OTS Madras took up the task of training Non-Technical, Short Service Commissioned (SSC) officers[7] as non-technical officer targets were achieved.

To meet the shortage of technical officers, many concessions were granted in order to attract volunteers. These included ante-dated commissions based on period of civil service and reservation of jobs after release from the Army.[8] Even these inducements do not seem to have been very effective, for in 1965, a new set of measures was announced. Under the Compulsory Service Scheme, all engineers under the age of 30 years working in the Central or State governments and Public Sector Undertakings were liable to serve for a minimum period of 4 years in the Army.[9]

To meet increased requirements for the training of Other Ranks (ORs), 15 new training centres were established and existing centres expanded. The duration of training

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[7] ibid., p.23.

[8] ibid., p.19.

[9] Report 1965-66, p.15. To supplement the capacity of the College of Military Engineering, 32 army officers were also deputed to attend engineering courses at various civil engineering colleges.

was also reduced initially and was later restored progressively as trained personnel became available.[10] The period of colour service for OR's was also reduced. Formerly, they could be in colour service for a period of 7-15 years with provisions for extension for another 5-10 years, depending on the type of service (technical or non-technical). From January, 1965 the period of maximum colour service was reorganised as follows:[11]

Group I	(non-technical)	10 years
Group II	(technical)	12 years
Group III	(highly technical)	15 years

The provisions for extensions were withdrawn.

The training program was also reoriented towards mountain warfare and the capacity of the High Altitude Warfare School was doubled as battle inoculation (simulated battle training) was reintroduced.[12] A Commando Course for officers was introduced at the Infantry School, Mhow, from March, 1964.[13]

Substantial reorganisation of the Army Headquarters also took place. The new Directorate of Combat Development, which had been set up in November 1963 to look after development of weapons and tactical concepts was placed under a full-time director with the rank of Brigadier in

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10 Times of India, March 14, 1964.

11 Report 1964-65, pp.18-19.

12 Hindu (Madras), October 21, 1963.

13 Report 1964-65, p.23.

1965.[14] The responsibilities of the Chief of General Staff (CGS) were redistributed between the Deputy Chief of Army Staff (redesignated Vice Chief of Army Staff) and the CGS (redesignated Deputy Chief of Army Staff). The post of Deputy CGS was abolished and the appointments of Director of Staff Duties (DSD) and Deputy DSD were upgraded from the ranks of Brigadier and Colonel to Major General and Brigadier respectively.[15] The post of Director of Military Operations was also upgraded from Brigadier to Major General and that of the Deputy Director of Military Intelligence from Colonel to Brigadier[16] as the strength of the Military Intelligence Directorate increased by about 50 per cent.[17]

A new Central Command had already been formed out of the Eastern Command in 1963[18] and in 1965 Delhi Area was carved out from the old Delhi and Rajasthan Area, with the Rajasthan Area being put under a separate General Officer Commanding.[19] The Jammu and Kashmir Militia which had been raised primarily as a temporary police force in 1947 was reorganised as a permanent force within the Army.[20]

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14 Report 1965-66, p.12.

15 Report 1964-65, p.18.

16 Report 1965-66, p.12.

17 Lorne J. Kavic, p.195.

18 ibid.

19 Report 1965-66, p.13.

20 Report 1964-65, p.18.

A new 'discard before overhaul' policy for the Army's vehicle fleet was also evolved, under which 1 ton and 3 ton vehicles were to be replaced on completion of 35,000 miles or 7 years service - whichever was later but before any major overhaul. As a result of this replacement policy over 35,000 vehicles were declared for disposal in just three years - 1964-67.[21] The acquisition of vehicles was also standardised in the form of Shaktiman 4x4 and Tata Mercedes Benz 4x4, 3 ton trucks, Dodge and Nissan 1 ton trucks, Nissan Patrol and Willy's Jeeps and Royal Enfield motorcycles.[22]

Decisions were also made to provide the Army with modern weapons, equipment and stores. It was decided to standardise all small arms to the 7.2 mm bore.[23] The .303 Lee-Enfield rifles were to be replaced by the semi-automatic Ishapore model 7.62 mm rifles and the Sten machine carbines by the Sterling, also of British origin, being produced indigenously.[24] An indigenously designed mortar replaced the 4.2 in. mortar hitherto in use[25] and the French manufactured Brandt heavy mortar, originally received under the aid program later began to be produced indigenously.[26] Modified Chieftain tanks of British design,

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21 Report 1966-67, p.16.

22 Report 1964-65, p.25.

23 ibid.

24 Lorne J. Kavic, p.195.

25 ibid.

26 Report 1964-65, p.25.

the Vijayanta began to be manufactured under licence at Avadi from 1965-66[27] and licence was also acquired for the indigenous manufacture of 106 mm recoilless guns from the USA.[28] One area where modernisation seems to have been a problem was signals, communication and engineering equipment. This was because of an insufficiently developed electronic base in the country at that time and requirements had to be met via imports, either under aid programs or on credit terms although steps were being taken simultaneously to improve indigenous manufacture at Bharat Electronics (BEL) under collaboration agreements.[29] But despite all efforts, even as late as 1966, the situation regarding signals equipment was 'not entirely satisfactory'.[30]

The brief war with Pakistan in 1965 and the subsequent British and American embargoes did upset the reequipment program as of a total of Rs.760 million promised as military aid by the United States, approximately 45 percent (Rs.361.3 million) had been delivered before the embargo and this had been utilised for providing support for a number of mountain divisions as well as earth moving equipment for the Border Roads Organisation. Britain had

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27 Discussed in detail in the chapter on defence production.

28 K. Subrahmanyam, 'Nehru and the India-China Conflict of 1962' in B.R. Nanda ed. Indian Foreign Policy: The Nehru Years (Delhi: Vikas, 1976), p.115.

29 Report 1964-65, p.26.

30 Report 1965-66, p.17.

promised Rs.360 million under the aid program and had delivered about Rs.224.1 million worth of equipment and spares.[31]

One direct consequence of the embargo was a change in the government's arms acquisition policy[32] and the Soviet Union, which was already supplying India with military hardware, was soon to emerge as the predominant supplier of arms. Thus, between 1965-66 and 1968-69 the USSR is reported to have provided India with about 450 T-54 and T-55 medium tanks and some 350 100 mm and 140 130 mm guns.[33] Another effect was to accelerate steps towards indigenous manufacture of equipment and by 1969-70 the reequipment of Infantry units had been completed while 'considerable progress' had been made with artillery and armoured units.[34]

In view of the experience gained in the 1965 Indo-Pakistan war, some internal reorganisation was undertaken and formations were further streamlined with a view to

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[31] See statement of the then Defence Minister, Y.B. Chavan, in Parliament on November 29, 1965. Reported in Times of India, November 30, 1965.

[32] Calling the embargoes 'unpardonable' in a speech to the Central Purchase Advisory Council, the then Minister of Supply and Technical Development, K. Raghuramaiah, indicated that future purchases would be made in countries 'more dependable' in a crisis. See Times of India, December 1, 1965.

[33] Military Balance 1968-69, p.47.

[34] Report 1969-70, p.14.

improving the teeth-to-tail ratio. Emphasis was laid on the study of enemy tactical concepts and battle inoculation courses were made more realistic[35] as armoured formations concentrated on night operations.[36] The organisation of the mountain divisions was also reviewed in the light of suggestions that they be broken up into smaller units for greater mobility and effectiveness but it was subsequently decided to make no changes.[37]

Training courses for officers too were further modified and improved. The duration of the Defence Services Staff College course was increased from 30 to 45 weeks.[38] The Infantry School at Mhow was bifurcated into an Infantry School and a College of Combat and new courses were introduced for Young Officers, Junior Commanders and Staff Officers. A new Institute of Defence Management for the training of middle level defence personnel was set up at Secundrabad.[39]

As a result of the various steps towards reorganisation and streamlining, although the strength of the Army remained constant since 1964 at 828,000 men, fighting capability increased considerably over the years so that by 1971-72 it comprised 25 Infantry Divisions (including mountain

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35 Report 1966-67, pp.12-13.

36 Report 1969-70, p.15.

37 ibid., p.14.

38 Report 1966-67, p.14.

39 Report 1970-71, pp.13-14.

divisions) as compared to 21 Infantry Divisions originally.[40] The 1970s also saw the formulation of a long term plan for a new and sophisticated electronic system as new electronic and communications equipment began to be introduced.[41] Called the Army Radio Engineered Network (AREN), this envisages a mobile and integrated system for the field army based entirely on indigenous design, development and production effort and involves licence manufacture or imports.[42] The plan is being implemented in two phases:

1. existing equipment will be modified to provide a 'secure' radio trunk system using manual instead of automatic switching
2. in the second phase, an integrated communication system with auto-switching on an area grid basis.[43]

Nevertheless by 1978 the project still seems to be substantially in the development and evaluation stage.[44]

Along with the implementation of the communications network, an Electronic Data Processing System (EDPS) is also being set up for the Army. The Army Integrated

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40 Report 1971-72, p.44. While these are official estimates giving the overall strength, according to the Military Balance 1971-72 (p.46), the infantry strength during this year included 13 infantry divisions, 10 mountain divisions, 6 independent infantry brigades and 2 parachute brigades.

41 Report 1970-71, p.12.

42 Report 1974-75, p.32.

43 Report 1977-78, p.15.

44 ibid., p.16 also Report 1975-76, pp.16-17.

Telecommunication Data System Plan envisages a number of EDP Centers to be established covering formation headquarters, ordnance depots, workshops and other establishments in order to meet computer requirements of all arms and services. Two computer systems (including one for training purposes) have already been established and a third is expected to be installed shortly.[45]

Further organisational changes have taken place in the 1970s as a result of the 1971 war. The unwieldy Western Command was split into two with the new Northern Command being created to cover Jammu and Kashmir (J & K), Punjab and certain areas of Himachal Pradesh while the Western Command includes Rajasthan and Gujarat.[46] This change was obviously very necessary because under the old set up, a single command had jurisdiction ranging from the mountainous terrain in J & K and Himachal Pradesh to the deserts of Rajasthan, thereby creating administrative and logistic problems. A new reservist policy also came into effect from February 1976 under which all OR's would be retained in colour service for at least 15 years in order to enable them to earn a pension.[47] Also, previously war casualties were replaced by reservists, but it was realised that this was a time consuming process and, as a

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45 Report 1977-78, p.17.

46 Report 1972-73, p.21.

47 Report 1975-76, p.17.

consequence, there has been an enhancement of the ceiling strength although the exact number has not been disclosed officially.[48]

However, the increase in overall numbers does not seem to have been prompted by the new reservist policy alone. Latest estimates place the strength of the Indian Army at 950,000.[49] If these are reliable, it would mean an increase of roughly 123,000 men over the last few years. This is certainly borne out by a comparison of the number of formations during the years 1972 and 1978. In 1972 there were reported to be 13 infantry divisions, 10 mountain divisions, 6 independent infantry brigades and two parachute brigades.[50] On the other hand, by 1978, the Army is reported to include 17 infantry divisions (with 1 more forming), 10 mountain divisions, 1 independent infantry brigade and 1 parachute brigade. During this period there has also been an addition of two independent armoured brigades.[51]

As mentioned earlier, while the re-equipment of infantry units had been completed by the late 1960s, the process of modernising and expanding the artillery and armoured formations had made only limited progress. Even in 1971, the artillery units consisted mostly of 25 pounders besides

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48 Report 1976-77, p.12.

49 Military Balance 1979-79, p.61.

50 Military Balance 1972-73, p.48.

51 Refer n.49.

the limited number of 100 mm and 130 mm guns imported from the Soviet Union.[52] This situation, however, improved considerably in the 1970s, as production of various weapons was finally taken up. Domestically manufactured artillery weapons supplied to the Army included the 75/24 mm pack howitzers and 105 mm field guns[53] as also French designed 81 mm and 120 mm mortars[54] and the 40 mm L70 anti-aircraft guns under licence from Bofors. Besides, the manufacture under licence of the SS-11 and ENTAC Anti-Tank missiles was also taken up.[55] Imports from the Soviet Union included BTR-50P and BTR-15L Armoured Personnel Carriers (APCs) and more T-54/55 tanks, the latter obviously because of shortfalls in the domestic production of Vijayanta tanks.[56] Czechoslovak derivatives of the BTR-50P, the OT-62/64, were also imported[57] and an agreement was reported to have been signed for their manufacture under licence in India.[58]

To strengthen the air defences, besides the manufacture of the L-70 AA guns, 40 Short Tigercat S-A systems, reported to have been ordered in October 1971,[59] were delivered by

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52 Military Balance 1971-72, p.46.

53 Times of India, October 30, 1975.

54 Jane's Weapons Systems 1978, p.850.

55 Discussed in the chapter on Defence Production.

56 Military Balance 1972-73, p.

57 ibid., p.48.

58 SIPRI Yearbook 1972, p.332.

59 SIPRI Yearbook 1972, p.

April 1973[60] and the Army is also said to have taken delivery of ZSU-23-4 Shilka self-propelled anti-aircraft guns sometime in 1977.[61] Besides these, the Army is also reported to possess SA-7 and SA-6 SAM's of Soviet origin but no confirmation is available.[62]

As far as armour is concerned, reports indicate that the Indian experience with the Vijayanta has been far from satisfactory. Although its domestic manufacture was taken up in an attempt to achieve self-sufficiency in tanks, the Vijayanta has reportedly not been able to live up to its specifications. Despite improvements performance of the engine did not meet requirements[63] while the armour is also said to be defective.[64] This was brought out in the 1971 conflict where the Vijayanta's were used as a second line of defence with the Soviet-built T-55s being used in the front line. Despite unsatisfactory experience with the T-55 also, the tank showing a tendency to overheat under desert conditions, an unsuccessful

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60 Military Balance 1972-73, p.78.

61 Flight International, March 18, 1978. Also Military Balance 1978-79, p.61.

62 Jane's Weapons Systems 1978, p.850. The 1977 edition (p.72) also mentioned that an agreement had originally been signed a few years ago for their manufacture under licence but which had since lapsed.

63 Kuldip Nayar in Times (London), September 16, 1978.

64 International Defense Review, 7/1978, p.1013.

attempt seems to have been made to mate the Vijayanta's 105 mm gun with the T-55 chassis.[65]

In February, 1978, the Defence Minister, Jagjivan Ram disclosed that a totally indigenous main battle tank was in an advanced stage of development at the Combat Vehicle Research Development Establishment, Madras.[66] In the context of current re-equipment programs, not much significance can be attached to the above statement given India's reported decision to replace the Vijayanta T-55s and Centurions with an imported tank. An agreement for the initial supply of 70 Soviet T-72 tanks is said to have been signed early in 1978[67] and deliveries are expected to begin in 1979.[68] Recent reports, however, reveal that a 'limited number' of T-72s are being acquired only for evaluation purposes and that even the British Chieftain and German Leopard 1 are under consideration.[69]

Conclusion:

Given the nature of land threats to the country, the expansion modernisation of the Indian Army was obviously the first priority in Indian defence planning immediately

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65 ibid.

66 Reported in Overseas Hindustan Times, February 23, 1978. Also, International Defense Review, 3/1978, p.306.

67 International Defense Review, 2/1978, p.270 also Military Balance 1978-79, p.106.

68 Refer n.63.

69 International Defense Review, 8/1978, p.1208.

after the Sino-Indian conflict of 1962. Manpower was no problem in the expansion program although some shortages of technically qualified personnel did persist for a few years. However, before the process could be completed the Army was involved in the war with Pakistan in 1965. Although not much information is available on this aspect, circumstantial evidence would suggest that the command and control structure still left much to be desired as well as the fact that much of the equipment at this stage, i.e. artillery armour and signals were obsolete and had yet to be replaced.

The arms embargo by the Western powers delayed this process even further, but can be said to have had beneficial effects on the long run. This is because it gave India an added impetus to go in for indigenisation programs in order to enhance self reliance and lessen dependence on erratic external sources of supply. Also, as a consequence, the Soviet Union emerged as the primary supplier of artillery and armoured vehicles - the only equipment still being imported for the Army, India having attained self sufficiency in small arms and vehicles.

Nevertheless, the changeover in the sources of arms supply as well as delays in indigenous manufacture of weapons did result in the fact that by the late 1960s, although all infantry units possessed arms of post-1960 design and manufacture, much had to be done by way of expansion and re-equipment of the artillery and armoured formations. This process can really be said to have got underway only

in the 1970s, although modest beginnings had been made earlier. Many of the tasks seem to have been fulfilled by the mid-1970s although there have been problems with the program of self reliance, for example the trouble with the Vijayanta and the eventual decision to replace them with imported tanks.

Over the years, especially as a result of experience gained in the 1965 and 1971 wars, substantial reorganisation of field formations and command structures have also taken place, presumably with beneficial results. Field formations have been streamlined and better organised with greater emphasis on mobility than before and the last few years have witnessed further expansion of the Army.

In other words, the Indian Army has come a long way from the ill-equipped force that it was at the time of the Sino-Indian conflict of 1962 although, instead of taking five years (1964-69) for the process, as originally envisaged in the Defence Plan, it required nearly a decade to really bring it up to the standards of a modern, well equipped force.

CHAPTER III

INDIAN NAVY 1964-78

Unlike the Army, development of the Indian Navy was not an effort which began only in the 1960s. Substantial expansion of Naval strength took place in the 1955-61 period during which 4 'Ton' class coastal minesweepers, 2 'Whisky' class and 3 'Blackwood' anti-submarine frigates, and 3 'Leopard' class anti-aircraft frigates were received from the United Kingdom. Furthermore, the Royal Navy's light fleet carrier HERCULES was purchased, modernised and commissioned in March 1961 as the INS VIKRANT.[1] Thus, by the early 'sixties the Indian Navy 'had reached a stage when the operational fleet and training ships could be formed into two separate entities',[2] although it was nowhere near having the strength and capabilities envisaged in the 10 year plan of naval expansion drawn up in late 1947.[3]

The 1962 war and its aftermath resulted in a complete revision of priorities as far as military expansion was concerned. The defence plan (1964-69) made only a passing

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[1] For a detailed account of the growth of the Indian Navy during the 1947-62 period see the chapter on 'The Indian Navy' in Lorne J. Kavic, India's Quest For Security: Defence Policies: 1947-65 (Berkeley and Los Angeles: University of California Press, 1967), pp.116-125.

[2] Vice Admiral N. Krishnan, 'Indian Navy Since Independence', U.S.I. Journal, October-December 1970, p.406.

[3] This envisaged the gradual development of a task force comprising 2 aircraft carriers, 3 light cruisers, 8-9 destroyers and the necessary support ships. See Lorne Kavic, p.117.

reference to naval requirements in that the Navy would be 'maintained at its present strength' and envisaged the 'replacement of older ships by modern vessels' as also the acquisition of a submarine and 'certain other vessels' as part of this program.[4] Much has been made of this hiatus in naval expansion from 1962 to about 1967 by observers, both official and unofficial. Vice Admiral N. Krishnan maintained that the 1962-66 period was a lean one for the Navy as emphasis was laid on modernisation and expansion of the Army and the Air Force and it was only after 1967 that the 'Naval Planners could see their way clear for the next phase of the modernisation of the fleet'.[5]

Another writer views the situation upto 1971 in two phases: (a) 1962-65, when the Navy was largely neglected except for verbal assurances from the Defence Ministry and (b) 1965-71, when the pro-Navy forces became more assertive and, as a consequence 'modest beginnings were then made to rearm the Navy'.[6]

It is not to be denied that building up a Navy is a far more capital intensive and expensive task than would be the case with the Army or the Air Force, but then, most of the purchases from abroad under the first National Defence Plan, whether from the Soviet Union or from the West, were made under loan agreements. Hence, it could be argued that

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[4] India. Ministry of Defence Report 1964-65, p.35. Hereafter cited as the Report.

[5] Refer n.2.

[6] Raju G.C. Thomas, 'The Politics of Indian Naval Re-Armament, 1962-1974', Pacific Community, Vol.6, No.3, April 1975, p.457.

the Navy did not expand during this period not because of its neglect by the policy-makers but by the lack of availability not only of ships but also of finance. However, before pursuing this line of argument further, it is essential to consider the threat-perception that lay behind the development of the Indian Navy in the 1950s.

It has been aptly observed that the Indian Government saw the Navy as an 'implicit part of a Commonwealth-United States naval defence of the lines of communication' although it had no desire to get involved in any East-West conflict. This was probably because of India's dependence on maritime-borne commerce with the West but the '... Navy's operational planning during the period 1947-62, however, seems to have contemplated operations, if at all, only against Pakistan ...'[7]

Also, during this period there seems to have been ample evidence of the government's reluctance to allocate funds for refits, maintenance and repairs of ships or for the development of adequate docking and repair facilities.[8] On the other hand, this can be attributed to poor planning by the Navy since given limited resources it tended to overlook the development of an adequate infrastructure to support naval deployments, in its haste to acquire more ships. There was also a continuous shortage of qualified personnel, both officers and technicians, which put 'a great

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[7] Lorne J. Kavic, p.123.

[8] ibid., pp.124-125.

deal of strain on the manning situation'.[9] But, despite the fact that the government was more conscious of the threat on the land frontiers, the Navy does seem to have been able to produce a somewhat credible case for naval expansion.

As early as 1963, the government was said to have accepted the necessity of a submarine fleet[10] and during his visit to the United Kingdom in 1964, besides other equipment, the Defence Minister was reported to have been interested in acquiring 3 frigates, 3 destroyers, a submarine and a couple of minesweepers[11] having earlier told the Parliament about the 'vast program' for the replacement of overage ships.[12] This was shortly after his visit to the United States where '... it was agreed that ... requirements in this field should first be discussed with the British government' and to the Soviet Union where

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[9] Vice Admiral N. Krishnan. Refer n.2, p.406. This is primarily because of a regulation that officers and men for a new ship could be recruited only after she had been commissioned. The rule has since been changed.

[10] Defence Minister Y.B. Chavan in Parliament as reported in Times of India, April 30, 1963. This was also mentioned in the naval review released on December 31, 1963 which also listed additional commitments undertaken by the Indian Navy like setting up of garrisons in the Andaman and Nicobar islands and preparations to take over coastal batteries (from the Army) strengthening of the aviation wing and setting up of new bases. See Asian Recorder, 1964, 5630:INI:A.

[11] K.C. Khanna in Times of India, November 15, 1964.

[12] Quoted in Times (London), September 22, 1964.

the '... authorities provided facilities ... to see the performance of the naval craft including submarines which they (are) in a position to supply to India ...'[13] Consequently, the attempt at acquiring British ships was a reflection of the pro-West bias that prevailed among the Defence establishment[14] but the visit was only marginally successful. The British authorities pointed out that it would not be possible for them to release the ships from their operational reserve but gave an assurance that the Indian '... request would be considered in the light of the review of their defence policy which they were currently engaged in'. They also '... indicated their willingness to provide facilities to enable ... (India) ... to place an order for a ... submarine ...' However, Chavan went on to say that a final decision could only be taken after details of the assistance that could be made available by the British was settled.[15] In the interim, the United Kingdom was reported to have agreed to provide India with a submarine for 2 to 3 months each year for a few years for training purposes.[16] Hence, the only achievement in

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[13] Statement in Parliament on September 21, 1964, quoted in Asian Recorder, 1964, 6100:INI:A.

[14] This point has been stressed by many writers. Later, '... the decision to move away from a predominantly British-oriented to a more Soviet-oriented fleet ... met with considerable opposition at Naval Headquarters'. Raju G.C. Thomas, 'The Indian Navy in the Seventies', Pacific Affairs, Vol.48, No.4, Winter 1975-76, p.502. See also Ian Clark, 'Autonomy and Dependence in Recent Indo-Soviet Relations', Australian Outlook, Vol.31, No.1, April 1977, p.153.

[15] ibid.

[16] Chavan's statement, as reported in the New York Times, November 27, 1964.

terms of naval modernisation was the agreement for a loan of £4.7 million for the modernisation and expansion of the Mazagon Docks and the construction, under licence of 3 Leander Class frigates.[17]

Thus, by the end of 1964, efforts for naval modernisation were well underway, despite the lack of obvious success. The government claimed to have offers for the supply of submarines both from the United Kingdom and theSoviet Union although a decision could be taken only after '... fully considering the financial implications and other factors'.[18] Other infrastructural measures had also been initiated. Steps were being taken to provide the Indian Navy with a fleet replenishment tanker. A naval air station (INS HANSA) was established at Dabolim (Goa) consequent on the purchase of 6 Sea Hawks from U.K. Manning of Coastal batteries was transferred to the Navy from the Army. Further expansion of the naval base (INS JARAWA) at Port Blair in the Andaman and Nicobar Islands was sanctioned. A Central Designs Organisation was set up at the Naval Headquarters to undertake ships design work.[19]

Nothing of any significance could be achieved in the first half of 1966 either, as discussions with the U.K. about submarine acquisition stalled, reportedly on the

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17 ibid.

18 Emphasis added. Chavan's statement in Parliament on November 30, 1964, as reported in Times of India, December 1, 1964. See also Times, December 1, 1964. The Soviet offer also included the supply of 'other ships'.

19 Report 1964-65, pp.35-38.

problem of finance.[20] Hence, it was only in August that a delegation left for Moscow to negotiate the purchase of naval vessels from the Soviet Union - a deal which had already been agreed to, in principle.[21] While disclosing no details, the signing of an agreement was formally announced in Parliament by Defence Minister Chavan on 6 September.[22] Soviet experts would also help plan a new east coast shipyard at Vishakapatnam and the deal was reported to include the purchase of four submarines, 'a number' of missile boats, patrol craft and landing craft.[23] Not only had the first steps towards naval expansion and modernisation been taken but also this was the first time that the Indian Navy was set to acquire vessels from a country other than the United Kingdom.[24]

After the 1965 Indo-Pakistan war emphasis on the maritime aspects of Indian defence increased.[25] Before this, naval debate tended to make vague references to

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[20] Times, August 4, 1965.

[21] Straits Times (Singapore), August 16, 1965.

[22] Keesings Contemporary Archives 1965-66, 21036C.

[23] Age (Melbourne), November 24, 1965.

[24] On this question there was reported to have been some worry in London about the security aspect of the exchange of naval information, but it was pointed out that India was already receiving Soviet aircraft and other material, and military information from one country was not passed on to another. See Times, August 6, 1965.

[25] For example a report in Times of India, January 13, 1969, stated that the Navy '... got attention following the 1965 conflict with Pakistan and ... secured a place in the plan which was reframed at a higher outlay ... to run from 1966 to 1971 ...'

Indian 'maritime interests' in the Indian Ocean, but the war and subsequent events brought into focus two significant aspects. Firstly, the ineffectual performance of the Navy during the hostilities, in which no naval action was undertaken except that the Indian Navy ... ensured the safety of ... ports and coastline ...'[26] And secondly, the decision by Pakistan and Indonesia to hold joint naval exercises. Naval planners, upto now accustomed to perceiving a naval threat from Pakistan, and to some extent from China, now had a new force to reckon with, although this factor was officially underplayed.[27]

Nevertheless, official naval statements tended to become more specific, The Naval Chief, Vice Admiral A.K. Chatterji, speaking at Enarkulam on May 26, 1966, not only mentioned the proposals to acquire new warships each year from then on, but also spoke of proposals for a new aircraft carrier and a program for the replacement of Sea Hawks.[28]

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[26] Report 1965-66, p.22. This would necessarily have been so, not only because Pakistan had acquired a submarine in 1964 (see Dawn, March 1, 1964) to counter which India had only overage vessels but also because the Navy was nearly one third short of its requirements for officers and men.

[27] For example, speaking in Parliament on November 29, 1965, Defence Minister Chavan said that the government did '... not attach premature significance to this matter as to create any imaginary difficulties'. Quoted in Times of India, November 30, 1965.

[28] Report in Asian Recorder 1966, 7156:INI:Q. The need for two naval task forces with aircraft carriers forming the nucleus was also underlined by other senior Naval officers, like Rear Admiral B.A. Samson (see, Times of India, June 2, 1966) and also received support by the Indian press. E.G. Editorial in Times of India, March 25, 1966. A few months earlier, speaking on the occasion of a naval review, President S. Radhakrishnan had stressed the need for sufficient number of submarines and naval aircraft to help defend the country. Reported in Times of India, February 11, 1966.

A few weeks later, Vice Admiral Chatterji elaborated further and spoke of the government's approval of development plans for the Navy on 'the more modern lines', that the Defence Minister was a 'Navy minded' man and the government was diverting its full attention now towards the Navy[29] and the massive development program would enable it to have two fleets.[30]

The Ministry of Defence Report for 1965-66 also stressed the efforts being made to expand naval establishments e.g. the Naval Dockyard Expansion Scheme at Bombay, and a report was to be prepared for the construction of a new dockyard at Vishakapatnam. Establishment of a naval base at Marinagao (Goa) and repair facilities at Port Blair were under consideration and efforts were being made to procure aircraft replacements for the VIKRANT.[31] Further efforts in this direction continued in 1966-67; apart from fighting vessels, two medium LSTs from the Soviet Union also joined the fleet and the keels of 3 Seaward Defence Boats were laid at Garden Reach Workshops, Calcutta.

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[29] As reported in Times of India, June 28, 1966.

[30] Times of India, July 1, 1966.

[31] Report 1965-66, pp.23-24. The submarine acquisition program, however, seems to have run into some difficulties during this period. Vice Admiral Soman was reported to have said (February 2) that no appreciable advance had been made in the matter of acquiring submarines. Despite the fact that an agreement on submarine purchase had already been signed Vice Admiral Chatterji was quoted as saying 'We are also trying to get submarines (see Asian Recorder 1966, 6964: INI:T and 7156:INI:Q). But this could also have been because of unwillingness by the Navy to accept Soviet equipment and attempts to seek them from the West.

Steps were taken to further improve facilities at the Naval Air Station Dabolim and an increase in the strength of the Naval Air Arm was under consideration.[32]

Naval arguments in favour of expansion developed further. Indigenous efforts at shipbuilding were emphasised and the Naval Chief now felt that India 'could acquire smaller vessels as carriers like Vikrant would cost a lot'.[33] The concept of a two fleet Navy received support in Parliament[34] and continued to be pushed by the Navy as the Chief of Naval Staff visited the Soviet Union for the purpose of acquiring more warships.[35] While it was conceded that there was little danger of a major invasion of the mainland the strategic importance of, as well as potential threats, to the offshore islands of Andaman, Nicobar and Laccadives from the Indonesian and Pakistan Navies were particularly emphasised. As a major innovation in this debate, reference was made to the growth of India's merchant shipping and stress was laid on the fact that the Navy should grow along with it,[36] that naval exercises underlined the need for replacing some of the destroyers

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[32] Report 1966-67, pp.24-25.

[33] Vice Admiral Chatterji quoted in Times of India, November 1, 1966.

[34] Refer Asian Recorder 1967, 7835-6:INI:N. See also Times of India, June 27, 1967.

[35] Statement of Vice Admiral Chatterji quoted in Times of India, September 29, 1967.

[36] Chatterji's speech as reported in Times of India, September 3, 1967.

'which had become extremely outdated.[37] One analyst advanced the concept of 'forward strategy' which involved

> ... mounting of guard on enemy naval bases, initiation of electronic warfare on the naval communication system of the enemy, harassing the enemy's supply lines with submarine and anti-submarine operations and finally engaging naval forces of the enemy in battle at a time and place of its own choosing.[38]

Some writers emphasised the fact that India, until the advent of the Muslims, had always been a maritime power and that subsequent neglect had resulted in colonisation,[39] while others, arguing from a more contemporary perspective, stressed the need for a stronger Indian naval presence in the Indian Ocean in order to establish a military balance of power as well as to counteract Chinese and Pakistani influence, especially after the British withdrawal.[40]

The latter point was perhaps overemphasised by Admiral Chatterji[41] who, speaking at a ceremonial parade in Bombay

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[37] Times of India, October 11, 1967.

[38] Bikash B. Basu, 'Military Evaluation of Seas and Oceans and the Geographic Basis of Sea Power', U.S.I. Journal, October-December 1967, p.369.

[39] Maj. Gen. Har Prasad, 'India - An Old Maritime Power', U.S.I. Journal, October-December 1967, pp.335-340.

[40] E.g. K. Subrahmanyam, 'Ebb and Flow of Power in the Indian Ocean Area', U.S.I. Journal, January-March 1968, pp.3-16. Also, Capt. N.P. Datta, I.N., 'The Vacuum and All That', U.S.I. Journal, April-June 1969, pp.105-112. For an article emphasising the role of submarines see Lt. Vishnu Bhagat, I.N., 'The Contribution of the Submarines to the American Victory in the Pacific', U.S.I. Journal, January-March 1967, pp.65-74.

[41] In keeping with the ongoing expansion, the post of the Naval Chief was upgraded to the rank of an Admiral w.e.f. March 1, 1968.

in March 1968 is reported to have said that the Indian Navy would be in complete charge of the Indian Ocean with the withdrawal of the British fleet in 1971.[42] Speaking a month after the visit of the Soviet Naval Chief, Admiral Gorshkov, he added that the Navy would acquire more ships and recruit more men - with most of the new equipment coming from the Soviet Union.[43]

Consequently, as a result of ongoing efforts over the last several years, the Indian Navy can be said to have 'come of age' only from mid-1968 onwards. The first of the Soviet built 'F' class submarine INS KALVERI joined the Navy in July, 1968, and another, INS KHANDARI was commissioned at the Soviet base in Riga in December. Two Commands were formed - the Western Fleet with headquarters at Bombay and the Eastern Fleet based at Vishakapatnam. It was also announced that the naval base at Goa would be upgraded and expanded to the level of that at Cochin. Two Petya-class destroyer escorts (INS KAMOTRA and KADMATH) joined the Navy in 1969.[44] A submarine depot ship (INS AMBA) was also acquired in 1969, and a helicopter squadron (composed of Al-IIIs) was formed at Goa to meet the logistics

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[42] As reported in Times, March 4, 1968.

[43] ibid.

[44] For documentation of these details see Raju G.C. THomas, n.6, pp.464-465. INS KHANDARI and the depot ship INS AMBA actually joined the Indian Navy on June 1, 1969. See Times of India, June 2, 1969.

and Air Sea Rescue requirements of the Navy.[45] Construction of the Naval Dockyard at Vishakapatnam began in August, 1969 and new training establishments at Goa, Cochin and Lake Chilka (Orissa)[46] were set up to cater to increased manpower requirements.

It was also during 1969 that the long-drawn debate about the second aircraft carrier ended when it was officially announced that

> For reasons of economy ... it has been decided to give up the idea of acquiring a second carrier and to arrange for suitable means of providing the necessary aerial support for the Navy. This would be done by developing facilities in the island territories and ports like Vishakapatnam.[47]

The problem of maritime defence was also more clearly enunciated in the context of (1) a large coastline; (2) island territories; (3) dependence on the sea as a means of communication - ever increasing mercantile marine requiring protection, and (4) development and augmentation of the submarine arm by Pakistan.[48]

This period can thus be considered as the beginning of the process of systematic planning and an improvement on the halting and hesitant nature of naval procurement

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45 Report 1969-70, pp.24-25.

46 ibid., p.27.

47 ibid., p.25.

48 ibid., p.23.

that the earlier years had witnessed.[49] There was also a change in the composition of ship types as much smaller ships i.e. PETYA Class destroyer escorts and OSA Class patrol boats with emphasis on missiles and speed joined the fleet. This was in sharp contrast with the conventional armament aboard the older destroyers and frigates of British origin.[50] The submarine wing was also strengthened with the acquisition of the third (INS KARANI) and fourth (INS KURSURA) submarines in February[51] and May 1970[52] respectively. To improve the range and effectiveness of anti-submarine operations, a Sea King ASW Helicopter Squadron (INAS 330) was sanctioned, and became operational in April 1971.[53]

In 1969-70, a new naval plan for the 1970s was also drawn up. While a balanced fleet of ships, submarines,

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[49] For example, the decision to buy OSA Class missile boats was taken only after the Israeli ship EILAT had been sunk by Soviet supplied missile boats of the UAR which India could have purchased as early as 1965. See K. Subrahmanyam in Times of India, August 4, 1970.

[50] There were, however, some reports that the Indian Navy was dissatisfied with Soviet vessels because of poor workmanship. According to Times of India (August 11, 1970) quoting a Daily Telegraph report, negotiations were in progress for the purchase of a number of British built frigates, which, according to Indian sources in London, was nothing new as the 'Indian Navy had always bought ships from Britain'. It appeared that 2 PETYA Class vessels manned by Indian officers had been forced to seek help from the Royal Navy at Hong Kong for repairs, while on passage from Vladivostok to Vishakapatnam!

[51] Times of India, February 7, 1970.

[52] Age, May 14, 1970.

[53] Statesman (Overseas), April 8, 1971. Also Times of India, April 18, 1971.

and naval aircraft was achieved under the first (1960s) plan, the second plan envisaged '... optimum use of ... existing ships and their phased replacement by the Leander class ....[54] An important feature of the Plan ... (was) ... a greater reliance on indigenous construction in future so as to eliminate ... dependence on purchase of ships from abroad ... also ... the buildup of necessary infrastructure in the country for shipbuilding and logistic facilities for the support of ... (the) expanding fleet'.[55] Although the necessity of design collaboration in the ship construction program was recognised, a beginning was made with the setting up of a new Directorate of Naval Design.[56]

Also, the pressure on resources had eased somewhat and since the buildup and reequipment of an 825,000 strong Army had been completed more funds could be diverted to the Air Force and Navy. Political support for the Navy had also increased as the Government grew more conscious of the increasing significance of Indian maritime interests,[57]

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[54] In addition to the 3 already under construction, further orders for 3 more Leander Class frigates were placed in June 1970. Refer Report of the Comptroller and Auditor General of India 1976. Part V. Mazagon Dock Limited, 1977, p.22.

[55] Report 1970-71, p.22.

[56] ibid., p.24.

[57] For instance in their Navy Day messages (1970), President V.V. Giri emphasised that '... with the rapid growth in the development of anval armament throughout the world, the task of our Navy assumes greater significance', Prime Minister Indira Gandhi called attention to the challenge facing the Navy and the opportunities open to it in view of the rediscovery by military thinking of the strategic and operational advantages of the sea, while Defence Minister Jagjivan Ram stressed that the Navy was being strengthened and modernised in recognition of its responsibility for the defence of 'this vast country and its island territories' and 'our growing maritime trade'. See Times of India, December 15, 1970.

particularly in view of Pakistan's acquisition of maritime reconnaissance aircraft and submarines.[58] Emphasis tended to be given to a naval fleet composed of Leander frigates, supported by smaller, Soviet-supplied naval craft as the ideal type for maritime defence of Indian coastlines and offshore islands.[59] Although, initially this trend developed for financial reasons,[60] and probably due to lack of suppliers other than the Soviet Union, it received further impetus after the 1971 war with Pakistan, in which the small missile boats performed well. This line of naval development obviously was not welcomed by senior naval officers, and arguments not only in favour of large ships but particularly in the support of aircraft carriers/Air Control Ships (ACS) were advanced. Without effective air cover it was said, establishing effective control of the seas would not be possible. On the other hand ACS carrying a mix of ASW helicopters and V/STOL aircraft, would enhance the striking power of the Navy.[61]

The 1971 war was a watershed in another way too. The average of the naval vessels was too high. The Navy's

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58 For a discussion on this refer to Dilip Mukerjee (November 21, 1970) and Inder Malhotra (September 17, 1971) in Times of India .

59 ibid.

60 This was officially acknowledged too. The Ministry of Defence Report 1971-72 stated that '... exigencies of the financial situation, coupled with the cost of modern warships, impose constraints on our capacity to develop the Indian Navy to meet all its inescapable obligations fully' (p.56).

61 Admiral A.K. Chatterji in Times of India, December 4, 1972.

successful performance in the war despite these handicaps brought greater attention to bear on its requirements. The government approved the expansion of the submarine arm and it was decided that in future, all ships of the size of frigate and above would 'carry some type of aircraft'.[62] The question of replacements for Sea Hawks and acquisition of long range anti-submarine aircraft assumed importance.[63] The war also '... brought into focus the deficiencies ...' and in view of the '... emerging situation in the Indian Ocean ...' the '... plans and priorities for Naval reequipment as provided in the Naval Roll-on Plan 1970-75...' were readjusted.[64] This process continued during 1973 when it was also made clear that modernisation and augmentation of fleet units would continue '... <u>despite the constraints of resources</u> ...'[65]

As mentioned earlier, the resource constraint, specially in terms of foreign exchange had spurted Indian attempts to go in for indigenous construction of warships and submarines. Negotiations on collaboration with the West in the manufacture of patrol boats were underway as early as 1969 after similar plans for collaboration with the Soviet

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[62] This decision was, in effect, a very pragmatic one given the fact that no funds were forthcoming for aircraft/ helicopter carriers.

[63] See statement of Naval Chief Admiral S.M. Nanda as reported in <u>Times of India</u>, November 22, 1972.

[64] <u>Report 1972-73</u>, p.30.

[65] <u>Report 1973-74</u>, p.29. Emphasis added.

Union (OSA Class?) had reportedly failed to materialise.[66] In 1970, the Deputy Minister for Defence Production P.C. Sethi, had stated in Parliament that the proposal to manufacture submarines with foreign collaboration was being actively considered.[67] Little or no headway seems to have been made, because two years later, the Defence Minister, Jagjivan Ram, was still speaking of establishing the production of submarines 'soon'.[68] While in 1974, the Minister for Defence Production, V.C. Shukla, announced that the possible use of nuclear propulsion for submarines was under study.[69] After unsuccessful negotiations with the Soviet Union, India was reported to have come close to signing an agreement with Sweden for the indigenous manufacture of the A14 class submarines,[70] but this too did not materialise.

Talks for the manufacture of corvettes also seem to have begun in the late 1960s or early 1970s, initially with the Soviet Union.[71] In 1972 the Chief of Naval Staff, Admiral Nanda disclosed that the choosing of a design for their manufacture was in the final stage.[72] In 1974, it was reported that the Mazagon Dock Ltd. was negotiating

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66 Times of India, October 6, 1969.

67 Reported in Times of India, September 7, 1970.

68 Times of India, October 6, 1972.

69 P.C. Tandon in Times of India, June 26, 1974.

70 International Defense Review, 4/1974, p.530.

71 Ravi Rikhye in Armed Forces Journal International, March 1975, p.14.

72 Times of India, October 29, 1972.

air agreement with France for the licenced production of an initial order of 25-30 of the new Type A69 Avisos[73] but this venture has not been successful so far and, as a consequence, 8 Nanuchka class corvettes were ordered from the Soviet Union.[74]

Although it emerged as the primary supplier of naval equipment, the Soviet Union seems to have been unwilling to enter into collaboration agreements with India on naval construction, unlike its policy on aircraft manufacture. This can perhaps be interpreted as an attempt, albeit unsuccessful, to ensure dependence, for it has also been reported that, after the 1971 war, the Soviets held up spare part shipments to India and later began refusing to deliver advanced equipment.[75] This is presumably one of the reasons why India decided to take up the indigenous manufacture of spares and other items for ships of Soviet origin 'on a planned basis'[76] and sought collaboration agreements with the West. For despite the recent agreement for the supply of 2 KASHIN Class destroyers to India,[77] it is important to note that Sea Harriers instead of the

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73 International Defense Review, 7/1974, p.671.

74 International Defense Review, 4/1976, p.535.

75 Ravi Rikhye. Refer n.71.

76 Report 1971-72, p.59.

77 Military Balance 1978-79, p.106. Also SIPRI Yearbook 1978, p.262.

Soviet Yakovlev STOL have been chosen to replace the aging Sky Hawks[78] and a decision on the outright purchase of licence and technology for manufacturing submarines (which is reported to be 'very close to finalisation') will be made from among 4 West European contenders - Holland, Sweden, France and West Germany.[79]

It can thus be inferred that the Navy did assume greater significance in defence planning particularly after the 1971 war. Paradoxically, this occurred at a time when the threat from Pakistan diminished in that the Navy no longer had the task of disrupting sea links between East and West Pakistan. Nonetheless, the development of Port Blair (Andamans) as an advanced naval base[80] was approved in 1972-73 on the grounds that it would '... serve as a focal point for the defence of ... (the) ... eastern coasts and for protection of (Indian) ... trade with the Far East'.[81] Other reasons given for strengthening the 'defence' of these islands include protection of (a) mineral

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78 ibid. Although performance characteristics must have been responsible for this decision, it should be noted that some years ago the Indian Navy was said to have been favouring the Yakovlev over the Sea Harrier. See Henry Stanhope in The Times, January 4, 1974. And Sydney Morning Herald (Sydney), January 4, 1974.

79 Subhash Chakravarti in Times of India, January 10, 1978. This decision is said to have resulted in a Soviet offer to convert India's existing submarine fleet to nuclear propulsion. Rear Admiral Yasenkov while on a visit to Bombay is reportedly said that the Soviet Union would be willing to share its experience in the field of nuclear propulsion with India. See International Defense Review, 2/1978, p.148.

80 Plans include a base repair organisation being set up at an approximate cost of Rs.15.3 million and was expected to be commissioned in March 1978. See Report 1977-78, p.23.

81 Report 1972-73, p.32.

and other resources (which are yet unknown);[82] (b) exclusive economic zone which has witnessed poaching by Thai and Taiwanese trawlers and lastly, some degree of concern about neighbouring countries (i.e. Thailand? Malaysia? Indonesia?) 'getting overpopulated and known to be acquiring more sophisticated naval capabilities than those which India has for the defence of these islands'.[83] A unified command structure comprising the three services i.e. Army, Navy and Air Force has been established and communication links have been established right through the island chain - from North Andaman to Great Nicobar.[84]

The creation of an Eastern Fleet along with the defence needs of the Andaman and Nicobar Islands have given an added significance to the port of Vishakapatnam, which, when developed would be the biggest in Asia. Strategically located mid-way between Madras and Calcutta, development of this base originally began soon after the acquisition of ships from the Soviet Union with all the attendant need for security as between the existing Western naval equipment and the new Soviet arrivals. While repair and other facilities for

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[82] Offshore drilling has begun only at one point so far and more is to follow.

[83] Sivadas Banerjee in Times of India, April 15, 1978. Located 1,300 km. east of the Indian Mainland the 350 island archipelago covers an area of over 8,000 km. stretching from a point 650 km. of the Burmese coast in the north to Pygmalion Point on Great Nicobar, which is about 150 km. from the northern tip of Sumatra (Indonesia).

[84] S. Dharmarajan in Times of India, December 30, 1976.

Western and indigenously produced ships exist in Bombay,[85] Vishakapatnam caters to vessels of Soviet origin i.e. 'F' class submarines, PETYA Class escorts, OSA Patrol Boats and includes a submarine base (INS VIRBAHU) which was commissioned in May 1971[86] as well as a submarine training school (INS SATAVAHANA).[87]

Besides these, the Navy was also able to resolve a long standing inter-service debate with the Air Force on the question of maritime reconnaissance. The Navy had for long been trying to take over this job which had hitherto been performed by the Air Force using obsolete Super Constellations acquired from Air India, as well as get approval for the acquisition of long range anti-submarine aircraft, proposals for which were reported to have been submitted in 1974.[88] There was opposition to this by the Air Force - on grounds of operational efficiency in the first case, and because of its more pressing need for replacement of bombers in the second instance. The debate seems to have moved in favour of the Navy in 1975 when the Government is reported to have agreed to allow the Navy

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85 These are being modernised and expanded at a total cost of over Rs.500 million and are expected to be commissioned by 1985. There are also plans to construct what would be the largest dry dock in the country at a cost of Rs.150 million. See Anita Katyal in Times of India, December 9, 1977.

86 Times of India, December 4, 1972.

87 Times of India, April 19, 1976.

88 Sudarshan Bhatia in Times of India, February 2, 1974.

to control maritime reconnaissance and anti-submarine operations and sanction the purchase of IL-38 ASW aircraft from the Soviet Union.[89] Formal approval was, however, given only in October 1976, and by October 1977, the Navy had acquired 3 IL-38 MR/ASW aircraft[90] with 2 more reportedly on order.[91] In fact, 1975-77 seem to have been the most productive years insofar as the Navy is concerned, for besides the IL-38s, orders have been placed for: 8 'Osa 65', 8 'Nanuchka', 2 'Kashin', 5 Ka-25 Hormone ASW helicopters, 92 SSN-11, 84 SSN-2, 144 SSN-9 missiles from the Soviet Union and 8 Sea Harriers and 5 Sea King ASW Helicopters from the United Kingdom.[92]

This steady improvement in the fortunes of the Navy has been a result of many arguments that have successfully been 'sold' to the policy makers, including that relating to the fact developing offshore oil and mineral resources and '... the impact of the changing maritime laws as a sequel to deliberations in the Law of the Sea Conferences'.[93] But, one significant factor which seems to have acquired great importance insofar as the naval threat perception was concerned is Iran's naval procurement program. For

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89 Statesman, May 29, 1975. See also Statesman Weekly, May 31, 1975.

90 Report 1977-78, p.21.

91 Military Balance 1978-79, p.106.

92 ibid. Also SIPRI Yearbook 1978, pp.262-263.

93 Report 1976-77, p.18.

example, the Ministry of Defence Report 1975-76 stressed the necessity of keeping a 'watchful eye' on '... naval developments in the littoral states which are acquiring most modern and sophisticated ships and aircraft ...'[94]

In a continuation of this trend and to relieve the Navy from strictly coastal and enforcement tasks an interim Coast Guard Organisation was set up from February 1, 1977,[95] and it formally became the latest addition to the Indian para-military forces in August 1978 when a bill was passed by Parliament.[96] Headed by a former naval officer, Vice Admiral V.A. Kamath, it is expected to concentrate on policing and protection of offshore installations, Indian fishing interests and the Exclusive Economic Zone, and organise anti-pollution and anti-smuggling measures. A 15-year plan for its development is reported to have been submitted and during the next 6 years is proposed to spend Rs.1 billion in expanding and strengthening the organisation.[97]

Conclusions:

As can be construed from the foregoing analysis, the Naval modernisation and expansion program took a few years to get underway after overall defence expansion began in

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94 Report 1976-77, p.18.

95 Overseas Hindustan Times, April 13, 1978.

96 Overseas Hindustan Times, August 31, 1978.

97 ibid.

1964. While the question of finance did have a significant role, the fact remains that the availability of ships from the conventional source, i.e. United Kingdom, was also a problem. Besides, not much attention seems to have been devoted in the early years to the development of strategic goals as well as infrastructural capabilities.

This situation changed after the 1965 war with Pakistan when the prospect of a naval confrontation with the latter, possibly in alliance with Indonesia and even China did not appear so unreal. Although the Indonesian threat declined in the years that followed[98] there was the simultaneous development of a new source of supply of naval vessels - the Soviet Union. Though the Navy still had to compete for funds with the sister services, it can by no means be asserted that such funds were not forthcoming.

Unlike the 1950s, the emphasis now shifted to the development of a submarine wing as well as an ASW capability - the latter because of the acquisition of submarines by Pakistan. As far as surface vessel were concerned, stress was laid on small, fast moving missile boats.[99] In other words, with the exception of the older vessels (including VIKRANT) the 'new' Navy was essentially a defensive one with its submarines providing limited offensive capability. Substantial investment was made in the Government owned shipyards and facilities created for the

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[98] How far this was a product of Indian naval thinking as against the fact that the only source for the Navy could supply only these types is, however, a debatable point.

[99] Discussed in Chapter on Defence Production.

production of ancillary vessels and coastal patrol boats for the Navy.[100]

The 1971 war proved to be a watershed as far as the fortunes of the Indian Navy were concerned. Despite the fact that all of its larger vessels as also its aircraft were over age, it put up a good performance thereby convincing the decision makers of the need to pay greater attention to this relatively neglected branch of the armed forces. This was also the phase when the debate about the relative utility of large surface ships began. It still continues. Opponents argued that not only are they too expensive to purchase but unnecessary, given India's strategic requirements. This argument has been strengthened after the creation of Bangladesh when the Indian Navy is no longer faced with the task of disrupting lines of communication between East and West Pakistan. Also, the performance of the small and relatively fast missile patrol boats gives added impetus to their arguments.

Supporters of the oceangoing fleet maintain that a 'balanced' fleet is essential for two reasons:
(a) to protect Indian shipping which would otherwise be susceptible to enemy operations in time of war, i.e. a certain amount of sea control exercised in specified areas, and (b) to develop an ability to attack the enemy's vital maritime interests. For these reasons, not only is it necessary to have large ships, but there is also the

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[100] Because of decline in effectiveness of her Navy as a consequence of the stoppage of Soviet aid after Sukarno's overthrow.

necessity of acquiring Sea Control Ships carrying a mix of aircraft and ASW helicopters.[101]

With the development of offshore oil resources and the increasing importance of the New Economic Zone concept, indications are that India has decided to go in for the development of a 'balanced' fleet. Inaugurating a symposium on marine engineering last year the Defence Minister Jagjivan Ram stated that the government had drawn up an 'ambitious' program to develop the Navy to protect the country's maritime interests.[102] A Coast Guard Organisation has also been set up to look after interests in the economic zone thereby implying a greater high seas role for the Navy in the future.

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101 That the debate is still unresolved is evident from a series of articles, for and against, which appeared in Times of India in January-March 1978. The writers included Admiral S.N. Kohli (Former Chief of Naval Staff), P.R. Chari (Director, Institute of Defence Studies and Analysis and former Joint Secretary, Ministry of Defence), Maj.Gen. S.N. Antia, Retd and Maj.Gen. E. Habibullah, Retd.

102 Reported in Times of India, May 14, 1977. The aircraft carrier INS VIKRANT too, is being modernised at an estimated cost of Rs.170 million. See International Defense Review, 6/1977, p.1188.

CHAPTER IV

INDIAN AIR FORCE 1964-78

Although the formal announcement of the decision to have a 45 squadron Air Force was made only in 1964-65 as part of the First National Defence Plan,[1] the 'Air Force was required to build up to its authorised ceiling of 45 squadrons' soon after the 1962 conflict with China.[2] Also, compared to the Army and the Navy, this service seems to have been less affected by financial constraints[3] and substantial acquisitions had been made in the 1953-62 period so that by 1962 the Indian Air Force (IAF) consisted of 25 regular and 7 reserve squadrons[4] as against the original intention of having a 'balanced' force of 20 squadrons by 1960.[5]

Consequently, during the 1960-64 period, sustained efforts were already underway to improve the capability of the IAF, a step which was necessary considering the fact that the IAF possessed an extraordinary complexity of aircraft - some thirty different types of Russian, Canadian, French, British, American and indigenous

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1 Report 1964-65, p.1.

2 Air Chief Marshal Arjan Singh, 'The Indian Air Force and Its Role in the Country's Defence', U.S.I. Journal, October-December 1970, p.413.

3 Lorne J. Kavic, India's Quest for Security: Defence Policies 1947-65, pp.108-109.

4 ibid., p.108. Also Appendix 10 in ibid.

5 ibid., p.102.

manufacture. The IAF had already become the first service to receive Soviet equipment in the form of Mi-4 helicopters, Il-14 freighters and An-12 heavy transport planes during 1960-62,[6] and, besides other efforts, initial talks about the purchase and domestic manufacture of the MiG-21 were already underway.[7] Also, negotiations had been completed for the purchase of SAM complexes which were to be installed in 'certain vital areas'.[8] Hence, the Plan did not involve any planning as far as the IAF requirements were concerned and merely served to incorporate earlier assessments and projections.

By 1964, India's search for aircraft had virtually become global. As a result, the United States, at various times was said to have been willing to provide F-102 all weather fighters,[9] F-51 Skyray[10] or F-5B Freedom Fighters.[11] One reason given for this in the press was that India was not in a position to acquire the MiG's as the cost of setting up the complex of factories was prohibitive and that the IAF senior officers, who were not particularly

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6 ibid., p.105.

7 For details see ibid., pp.105-152. Also, Ian C.C. Graham, 'Indo-Soviet MiG Deal and its International Repercussions', Asian Survey, Vol.IV, No.5, May 1964, pp.825-830.

8 Report 1964-65, p.39. 102 SA-2 missiles purchased at a reported cost of $12 million were said to have been installed at 17 sites. See SIPRI Arms Trade Registers, p.35.

9 H.R. Vohra in Times of India, January 26, 1964.

10 Times of India, June 7, 1964.

11 H.R. Vohra in Times of India, March 19, 1965.

impressed with the MiG's, were said to prefer American aircraft.[12] There were also reports that the then Defence Minister, Y.B. Chavan had requested the United States to supply three squadrons of F-104G Starfighters during his visit to Washington in May, 1964[13] and that the US was expected to permit this sale.[14]

However, these attempts do not seem to have been successful and, as a consequence, an agreement for the supply of 3 Squadrons of MiG-21s was signed during Chavan's visit to Moscow later during that year.[15] Agreement was also reached on the domestic production of the aircraft.[16] During the same period it was decided that the future transport fleet would consist of (a) heavy types - the AN-12s acquired from the Soviet Union and (b) medium transports - yet to be decided upon although it was revealed that the suitability of the HS-748 was under consideration.[17]

Despite substantial acquisitions from the Soviet Union in the form of AN-12 transports, Mi-4 helicopters[18] and

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12 Refer n.9.

13 Times (London), May 15, 1964.

14 H.R. Vohra in Times of India, June 29, 1964.

15 Report 1964-65, p.39.

16 For details see Lorne J. Kavic, pp.199-200. See also the relevant section in the chapter on defence production in this thesis.

17 Report 1964-65, p.40.

18 In fact the Soviet offer to product Mi-4's in India under licence from Avaiaexport was declined on the ground that the 'numbers required did not justify their manufacture in India.' See Statement of the Minister of Defence Production K. Raghmamaiah in Parliament. Quoted in Lorne J. Kavic, p.197.

MiG-21 fighters, it should be emphasised that, their refusal to supply fighters to India notwithstanding, the Americans were still supplying other types of equipment and aircraft. Mobile radar units[19] and Harvard trainer aircraft[20] were provided and Washington agreed to help India establish an early warning system by supplying more powerful static installations/early warning stations[21] besides providing training facilities for IAF personnel.[22]

The indigenously manufactured Krishak II was to replace Austers for air observation post (AOP) duties in the plains and it was decided to develop a more powerful version of the Krishak II for AOP tasks at high altitudes.[23] Extension and improvement work was sanctioned at 23 airfields,[24] and it was decided that major repairs/overhauls of engines and airframes of aircraft of Soviet origin (except MiG-21's) would be done by the IAF.[25]

That the equipment and method of operation of the IAF were rather primitive even at this stage is clear from the recommendations of the high-level Committee on Safety that submitted its report in November 1964. Among other

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19 Lorne J. Kavic, p.196.

20 Report 1964-65, p.41.

21 ibid.

22 ibid., p.44.

23 ibid., p.41.

24 Times of India, March 14, 1964.

25 Report 1964-65, p.45.

steps, the Committee recommended (1) a revision of the Survey of India maps, (2) measures to improve the collection of meteorological data, (3) adoption of electric airfield lighting and ground control approach systems at all airfields and (4) provision of adequate numbers of fire fighting vehicles.[26] A decision was also taken to form an Operational Training Unit for advanced training in fighters, a task hitherto performed by operational squadrons.[27]

However, the re-equipment program suffered a setback when an embargo was placed on supplies of military equipment by the United States and the U.K. as a result of the war with Pakistan in September 1965.[28] It was officially admitted in the Defence Ministry's Report of 1965-66 that (the embargo) 'contributed to retard progress ... (toward the buildup to 45 squadrons) ... and have necessitated certain changes'.[29] The war was also the first time that the IAF was employed in an operational role since independence.

Nevertheless, it would be incorrect to lay too much stress on the effects of the embargo by the Western powers. In the context of the IAF it amounted to a shortage of spares and possibly ammunition and other 'commercial'

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[26] ibid., p.46. Some Ground Control Approach Radars and Communication equipment were finally acquired in 1965-66 and one was set up initially for training the same year. See Report 1965-66, p.28.

[27] ibid., p.42.

[28] Reported in Times, September 9, 1965.

[29] p.46.

equipment.[30] The only exception would be the supply of 40 Hunter aircraft which Britain was reported to be willing to provide before the embargo was imposed.[31] Also, by this time the Soviet Union was supplying a substantial part of Air Force requirements and no embargo was imposed by Moscow. In fact, an agreement for the supply of 40 Mi-4 helicopters at a reported cost of $4.5 million was signed on March 7, 1965[32] and the Minister for Defence Production told Parliament on August 8 that three Tu-124s had been acquired for the communications flight.[33] Besides the Soviet Union, France, which was collaborating in the manufacture of Alouette III helicopters did not impose any embargo as the first Indian-assembled helicopter flew in June 1965 and regular production began in 1965-66.[34]

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[30] This was indirectly admitted by the Minister of Supply K. Raghuramaiah in Parliament on November 26, 1965, when he spoke of locating alternative sources while criticising Britain for stopping the supply of 'spares and other materials required for combatant and non-combatant aircraft'; that out of orders worth ₹7 million, only ₹500,000 worth of supplies had been received. Reported in Times of India, November 27, 1965, also Times, November 27, 1965.

[31] H.R. Vohra in Times of India, March 20, 1965.

[32] Asian Recorder, 1966, 7005:INI:F.

[33] Reported in Asian Recorder, 1966, 7267:INI:F.

[34] This program is discussed in detail in the Chapter on Defence Production.

In any case, the British restrictions were lifted in early 1966[35] while the U.S. State Department announced the lifting of the embargo on supply of non-lethal equipment on March 2, 1966[36] and sale of spares for lethal equipment was resumed in April 1967.[37] Also, while the United States decided to terminate the already suspended military assistance program (as also to Pakistan) in April 1961,[38] two points are worth mentioning:

a) although the value of military assistance actually provided was Rs.361.3 million as against the promise of Rs.760 million worth of equipment,[39] the bulk of the supplies under the aid program were non-lethal items such as road building machinery, transport vehicles and radar and communications equipment.[40]

b) at about the same time the United States is said to have agreed to provide India with a $17 million loan to finance a military communication system project which had been decided on after the Sino-Indian conflict

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35 SIPRI. Arms Trade with the Third World (Stockholm: Almqvist & Wiksell, 1971), p.485. (Hereafter cited as SIPRI. Arms Trade with the Third World).

36 Asian Recorder, 1966. 7004:INI:C.

37 Refer n.35.

38 Times of India, April 13, 1967.

39 Defence Minister Y.B. Chavan's statement in Parliament on November 29, 1965, reported in Times of India, November 30, 1965.

40 Times of India, April 18, 1967.

of 1962.[41] Called Peace Indigo this military communication system was expected to link with the Air Defence Ground Environment System (ADGES)[42] which is being set up with technical assistance from Thomson CSF (France).[43]

The acquisition of fighter aircraft, however, proceeded very slowly till 1967 when 36 Hunter F-56 and 12 Hunter T-66D refurbished aircraft were purchased from the U.K.,[44] in response to an offer which was reported to have been made in early 1965.[45] While domestic manufacture of the Gnat continued, the production of the Marut HF-24 fell considerably behind schedule and this was the probable reason for an order from the Soviet Union for 100 Sukhoi SU-7 aircraft, at a unit cost of $1 million which were delivered between 1968 and 1970.[46] Thus by 1969-70, the Defence Ministry officially announced that the MiG-21 and SU-7 squadrons were at full strength and Vampire and

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41 SIPRI. Arms Trade with the Third World, p.485.

42 Report 1969-70, p.29.

43 Jane's Weapons Systems 1978. Equipment for this includes mobile and statis 3-D radars which are being manufactured under licence at the Ghaziabad unit of Bharat Electronics Ltd., planning for which commenced in 1967. See Times of India, November 22, 1967.

44 SIPRI. Arms Trade Registers (Stockholm: Almqvist & Wiksell, 1975), p.35.

45 H.R. Vohra in Times of India, March 20, 1965.

46 Refer n.44.

Toofani aircraft were being phased out, while admitting that the Mysteres would be retained in active service till they were replaced by HF-24s.[47]

These purchases notwithstanding, the aircraft acquisition policy of the Government still remained to be worked out in detail and it was to this end that an Aeronautics Committee was set up in late 1967,[48] headed by the then Industries Minister, C. Subramaniam. The aim of the committee was to review the entire field of research, development and production of aircraft and allied equipment and to advise the Government on the quickest and most economical way of achieving self-sufficiency. In its report submitted in 1969, the committee recommended the development of an advanced technology aircraft around a proven engine (obviously imported) along with the simultaneous development of an indigenous advanced technology engine. With regard to bombers, the committee made it quite clear that India's domestic needs did not justify their domestic manufacture.[49] In other words replacements for the aging Canberra's were to come from abroad.

In what was described as an attempt to facilitate the implementation of these proposals, it was decided that future requirements of new aircraft for the IAF would be 'as far as possible, met by indigenous production'. A

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47 Report 1969-70, p.29.

48 Times of India, November 11, 1967.

49 Reported in Times of India, May 16, 1969.

10 year requirement plan was approved and this included the replacement of Gnats by an improved version of the MiG-21.[50] Even then, some indecision still prevailed. Studies for the selection of a suitable medium type transport were expected to be completed by 1970 - more than six years after they began and, possibly as a result of this delay the indigenously manufactured HS-748s replaced the obsolete Dakotas in the communication and training roles.[51] The idea of having a more powerful version of Krishak for AOP tasks at high altitudes was finally given up in favour of using helicopters[52] - the SA315B Cheetah, a derivative of the Alouette III.

Possible reasons for the indecision in the bomber procurement policy were obviously the failure of the Mach 2 version of the HF-24 to materialise as also the unsatisfactory delivery schedule of the Mach 1 (Marut) version. Meanwhile, there must have been some attention devoted to alternatives, since, according to at least one newspaper report, during his visit to India in 1968, the Soviet Defence Minister Grechko was approached with an Indian request to manufacture the MiG-23.[53] Soon after a British team visited India with an offer for the manufacture of Jaguar aircraft under licence.[54] Financial constraints were probably a major

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[50] Report 1969-70, p.29.

[51] ibid., p.30.

[52] ibid.

[53] Ernest Weatherall in Christian Science Monitor, May 15, 1969.

[54] ibid.

obstacle because instead of replacing the aging Canberra bomber, India purchased 10 Canberra B(1)12 aircraft from New Zealand[55] and another batch of 12 Canberra B-15 and 16 ex-RAF refurbished aircraft from U.K.[56] during 1970-71 to bring the 3 existing squadrons to full strength.

Substantial reorganisation, in order to increase administrative efficiency, was also undertaken during these years. Hindustan Aeronautics (HAL) was made responsible for procurement of all spares, imported as well as domestic.[57] Previously, different aspects of a single aircraft or weapon system were dealt with by different directorates of the IAF. This was now changed and integrated cells in the maintenance branch were formed.[58] The four technical branches of the IAF were integrated into two technical branches.[59]

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55 Times of India, November 20, 1970.

56 Times of India, November 26, 1970. The purchase from UK was made with the concurrence of the United States as the bombers although British built, had some US manufactured ancillary equipment. This was the second time that the US lifted its arms embargo to facilitate acquisition of lethal weapons by India (the first instance was the sale by Britain of Hunter aircraft within some months of the 1965 conflict) but this was offset by the US decision to sell 1/2 squadron of identical aircraft, along with interceptor aircraft and armoured personnel carriers to Pakistan.

57 Report 1969-70, p.31.

58 Report 1969-70, p.28.

59 These were (a) Aeronautical Engineering (Mechanical) branch out of technical engineering and technical armament branches and (b) Aeronautical Engineering (Electronics) branch out of technical electrical and technical signals branches. See Report 1971-72, p.69.

The performance of the IAF during the 1971 war was quite satisfactory, despite a shortage of suitable aircraft imposed by financial constraints. Vampire and Harvard trainer aircraft were refitted and equipped with Air-Surface rockets for ground support roles, AN-12 transport aircraft were used for carpet bombing and aircraft were modified to use electronic counter measure (ECM) equipment.[60]

Also the air defence and communications system, ADGES had not begun to be implemented until early 1971[61] when an agreement was signed with Radio Engineering Laboratories (New York) for the supply of $4 million worth of radio equipment - the first instalment for the microwave system.[62] However, before much could be accomplished on the Peace Indigo project war broke out in December 1971 and the United States Government embargoed new aid commitments and suspended the licensing of military shipments to India, so the project came to a halt.[63] Meanwhile, indigenous development efforts on ADGES as a whole continued, from

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60 Report 1971-72, p.66. The Indian MiG-21 is probably the only aircraft of its type in the world that incorporates EW Suite AR-753, RWR, pad mounted jammers and reconnaissance pads of Swedish manufacture. The same equipment that is used in the Viggen. See The International Countermeasures Handbook 1977-78, EW Communications Inc. Palo Alto, California, p.198.

61 Report 1971-72, p.68.

62 William Drummond in Australian, July 2, 1974.

63 See Statement of Minister of Defence Production, V.C. Shukla in Parliament. Reported in Times of India, March 29, 1974.

1971-72 at 9 research and training centres.[64] A Tropo Spheric Training School to cover Radar and Tropo Spheric Scatter Communication Systems was established at Delhi (later moved to Bangalore)[65] and automatic air defence data handling systems were developed at the Tata Institute of Fundamental Research, Bombay, while Electronics Corporation of India Ltd. (ECIL), Hyderabad, a government undertaking, was entrusted with the manufacture of antenna[66] and other equipment by Bharat Electronics and Indian Telephone Industries.[67]

The first high power static radar was successfully completed by the Radar and Communication Project Office (RCPO) and handed over to the IAF in 1976 while a second one was expected to be operational by June, 1978.[68]

The communications part of ADGES, i.e. the Peace Indigo project resumed only in late 1973/early 1974 when the US Government lifted the embargo imposed earlier.[69] It was also reported at that time that sophisticated electronic warfare systems such as the Watkins-Johnson QRC-259 collection system might also be supplied to India.[70] This

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64 These included the 5 Indian Institutes of Technology, Indian Institute of Science Bangalore, National Physical Laboratory Delhi, Institute of Radio Physics and Electronics Calcutta, and the University of Roorkee besides the Defence R & D Laboratories. See Report 1975-76, p.26.

65 Report 1974-75, p.45.

66 ibid., pp.46-47.

67 Report 1975-76, p.25.

68 Report 1977-78, p.30.

69 Refer n.63.

70 International Defense Review, 1/1974, p.26.

program has been divided into various stages by region and phase. The links in the first stage were expected to become operational by January 1979, and the second stage is scheduled for completion by early 1980.[71]

While completing of ADGES was delayed because of external difficulties, aircraft acquisition - trainers, transports and bombers - has been a victim of indecision, delays in domestic production as well as financial constraints.[72] The replacement program for the medium transport fleet is a good example. While the long term perspective plan for the transport fleet was scheduled to be finalised by 1970 (as mentioned earlier), the only decision that could be reached by 1974-75 was that pending policy formulation, a military freighter version of the HS-748 would be inducted into the IAF[73] to reduce the multiplicity of types in service. There is also some evidence to suggest that this decision was not entirely welcome to the IAF.[74]

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71 Report 1977-78, pp.30-31.

72 The problem of finance is significant because over the years the capital outlay on the Navy increased while that on the IAF decreased. For example the capital outlay on the IAF as a percentage of total capital expenditure on the armed forces declined from 38.4% in 1965-66 to 14.6% in 1970-71 and 11.7% in 1975-76. The capital expenditure on the Navy during these years increased from 7.7% to 34.3% and 37.4% respectively. Figures based on Defence Services Estimates, 1962-63 - 1973-74 as quoted in Raju G.C. Thomas, 'The Politics of Indian Naval Rearmament 1962-1974', Pacific Community, Vol.6, No.3 and Defence Services Estimates 1977-78.

73 Report 1974-75, p.41.

74 P.V.R. Rao, Defence Without Drift (Bombay: Popular Prakashan, 1970), p.240.

With regard to trainers, the original intention was to acquire the indigenously manufactured HJT-16 Kirans but shortfall in domestic production forced the IAF to look abroad for the replacement of Harvards and Vampires. There were some reports of an impending agreement with Czechoslovakia for the purchase of Aero L-39 trainers[75] but this obviously did not materialise. An order for 50 Polish WSK-Mielec TS-11 Iskra Jet trainers was placed in May 1965 and these aircraft were delivered from 1976 onwards.[76] This, coupled with a restructuring of the IAF training program is reported to have produced an embarrassing surplus of Kirans, some of which are now going into storage.[77]

In the case of MiG-21 too, domestic production is reported to have failed considerably behind schedule. Against a projected annual production rate of 30, only 10-15 MiG-21MS could be built,[78] resulting in an import of 50 MiG-21 PFMAs from the Soviet Union during 1974-76[79] to equip two squadrons. There were also said to have been other problems - the Soviet Union is reported to have held up spare part shipments after the 1971 war.[80] Licence

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75 SIPRI. Yearbook 1975, p.230.

76 SIPRI. Yearbook 1976, p.264.

77 Flight International, July 8, 1978.

78 Flight International, March 8, 1978, p.756.

79 Of these 27 were delivered complete from the USSR and 23 assembled in India from knocked down parts. See SIPRI. Yearbook 1975, p.209.

80 Ravi Rikhye in Armed Forces Journal International, March 1975, p.14.

payments were reported to have been demanded in dollars instead of in kind as had been the practice earlier.[81] This could have been a consequence of excessive dependence on the Soviet Union which came about during the IAF expansion in the late 1960s and early 1970s. However, as is discussed below, the situation has altered radically over the last few years for reasons not unconnected with the program for the replacement of the light bomber fleet i.e. the acquisition of the Deep Penetration Strike Aircraft (DPSA).

Apart from the delay in the finalising of the medium transport policy, the decision on replacing the Canberra and Hunter aircraft took a long time to reach agreement - a decade after the necessity was first recognised. In this instance it was not the lack of availability of suitable aircraft. The predominant problem was one of finance. The Defence Ministry, in its annual Report of 1974-75, revealed that a long term plan for the strike element of the IAF had been drawn up. While making a passing reference to the fact that indigenous development and production of long range strike aircraft were under consideration, it went on to admit that the Government was on the look out for more sophisticated aircraft 'for induction to the IAF consistent with the availability of

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81 SIPRI. Yearbook 1973, p.363.

resources'.[82] The same point was made by a usually well informed journalist in a leading national daily, who wrote that although the need for replacement of the light bomber fleet had been accepted in principle, the finance required was not immediately available.[83] This limitation was stated more explicitly in the Defence Report of 1976-77 wherein it was stated that the IAF was:

> ... now entering a phase of modernisation of its aircraft and equipment ... a balance has, however, to be struck between needs, costs, dependence on imports and the requirements of other spheres of national growth and development.[84]

However, Indian balance of payments situation improved. Foreign exchange reserves rose significantly in the period from 1976[85] and the acquisition of the DPSA, given the long standing requirements, became inevitable. Three aircraft were considered. As not only available but also satisfying Indian operational requirements, they were the Anglo-French Jaguar, the French Mirage F-1, and the Swedish Viggen.[86] Also, the manufacturers of all three aircraft agreed to the two Indian pre-conditions i.e. (a) manufacture of the

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82 p.40. Emphasis added.

83 Dilip Mukerjee in Times of India, April 3, 1976.

84 p.24.

85 By 1978, the foreign exchange reserves amounted to $7 billion approximately. See The Economist, December 30, 1978, p.36.

86 It was also reported that the Soviet Union offered India the MiG-23, SU-20 and SU-22 along with proposals for their manufacture under licence but the offer was turned down as none of the aircraft met the minimum requirement of a range of 300 nautical miles. See Times of India, February 10, 1978. Also International Defense Review, 7/1978, p.1161.

selected aircraft in India, and (b) a buy-back plan under which the manufacturer would purchase Indian-made spares, sub-assemblies and other equipment.[87]

Accordingly, an Indian team visited the manufacturers' establishments in February 1978,[88] ostensibly to open negotiations as also to see the plants and submitted its report to cabinet towards the end of March.[89] The Government decision to acquire the Jaguar was formally announced in October, 1978. But, there is some evidence to suggest that the Government of India had made up its mind in favour of the Jaguar as early as January 1978 when the British Prime Minister, James Callaghan, during his visit to New Delhi was reported to have told a press conference that a team of British experts would be visiting India shortly to continue negotiations on the proposed Jaguar deal.[90] The fact that the United States refused to approve the Swedish sale of Viggens to India, despite a personal request by the Swedish Commerce Minister, Linder, effectively removed the Viggen from contention.[91]

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87 Times of India, March 28, 1978.

88 Times of India, February 10, 1978.

89 Refer n.87.

90 P.R. Chari in Times of India, January 20, 1978. Callaghan is also reported to have discussed this issue with the Indian Finance Minister, H.M. Patel who was on his way to New York, in September 1978, a few weeks before the decision was announced. See G.K. Reddy in Hindu (International Edition), October 28, 1978.

91 U.S. approval was necessary since the engine and certain electronic equipment in the Viggen are manufactured under U.S. licence. For details see Aviation Week & Space Technology, August 7, 1978, p.20. Also Flight International, August 18, 1978, p.521.

The official reasons given for the choice were (a) the terms of payment were the most favourable, (b) British Aerospace offered the quickest delivery schedule and (c) it was the only contender which had two engines - thereby providing an additional safety factor.[92] The deal reportedly worth about Rs.1.3 billion (approx. £816m.)[93] provides for the acquisition of one squadron (18-20 aircraft) on lease from the RAF by the middle of 1979 after which British Aerospace would begin deliveries at the rate of two aircraft per month at a unit cost ranging between Rs.60 million and Rs.80 million depending on the equipment and spares specified by India.[94] The leased aircraft are proposed to be returned to the RAF by mid-1980 by which time the first operational squadron would be formed. According to present plans, India proposes to purchase about 40 Jaguars (2 squadrons) before the first phase of indigenous manufacture begins in 1980. About 110 to 120 planes are to be built under licence by 1985 to raise about six to seven squadrons in all, replacing the Canberra and Hunter squadrons.[95]

Just after the decision on the Jaguar was announced that a Soviet delegation led by the Deputy Minister for Aviation Industry, I.S. Silayev, visited India in the last

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92 Defence Minister Jagjivan Ram's statement reported in Overseas Hindustan Times, November 2, 1978.

93 A. Hariharan in Far Eastern Economic Review, October 20, 1978, p.37.

94 Flight International, November 4, 1978, p.1630.

95 G.K. Reddy in Hindu (International Edition), October 28, 1978.

week of October and several agreements for the transfer of technology relating to the production of the MiG-21 BIS variant as also to accelerate the pace of indigenisation were signed. These were precisely the areas where Soviet cooperation had not been very forthcoming. The possibility of export of Indian made spares and accessories to equip Soviet MiG-21s is also to be explored.[96]

Conclusions:

The expansion and modernisation of the IAF in theory at least was set in motion in the early 1960s, much before the Defence Plan of 1964. Delay in its implementation was inevitable given the pro-West attitude of the IAF senior officers which later changed primarily because of Western unwillingness to provide modern fighter aircraft to India. Other equipment, such as radar systems and communication equipment however, has continued to be bought from Western sources or manufactured in India under licence, despite occasional embargoes by the United States. While the reason for this could have been the lack of availability of such equipment from the Soviet Union, this could also be viewed as an attempt to diversify sources of supplies and as further evidence of the fact that preference for Western equipment still persists.

In terms of organisational infrastructure i.e. development of airfields and acquisition of allied equipment, much effort had to be put in during the 1960s, to remedy the

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[96] See Editorial in Economic and Political Weekly, Vol.XIII, No.42, October 21, 1978. See also Hindu (International Edition) October 28, 1978 and Flight International, November 4, 1978, p.1630.

neglect of the 1950s. This would seem to have been due to lack of proper planning and assessment of the operational requirements of the IAF. But then, this in a somewhat lesser sense is also a factor that prevailed in the 1960s especially in the context of the aircraft acquisition policy. The lack of a comprehensive plan for the transport fleet is a case in point. Uncertainties in the delivery schedule of aircraft being indigenously manufactured[97] could have been an additional factor contributing to haphazard planning.

Also, the IAF does deserve credit for improvisation and getting the best performance from whatever aircraft and equipment it did possess. The incorporation of Swedish ECM equipment in MiG-21s is an ideal example. This is despite drawbacks as in the context of the bomber fleet because even the Soviet built SU-7 aircraft do not seem to have been very successful operationally[98] and the decision to replace the Hunter and Canberra bombers took a decade to materialise. The Jaguar agreement, in a way, can be interpreted as an indication of the inability of Soviet aircraft to satisfy Indian operational requirements although the modified MiG-21 is likely to remain a front-line interceptor in the IAF well into the 1980s.

The radar and communications network (ADGES) has fallen considerably behind schedule, primarily because

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[97] This aspect is discussed in detail in Chapter V on Defence Production.

[98] See Flight International, July 8, 1978.

of US embargoes but, one long term benefit of this has been to accelerate the attempts at indigenisation. Thus, when ADGES becomes fully operational, sometime in the early 1980s, it can be assumed that the whole system would not be so susceptible to stoppages of spares as it would have been the case earlier.

CHAPTER V

DEFENCE PRODUCTION - 1964-78

Defence production in India dates back to the period of British rule but serious attempts at expanding the production base began only in the late 1950s under the stewardship of the then Defence Minister, V.K. Krishna Menon. Besides expanding the network of Ordnance Factories, many public sector undertakings (some started from scratch e.g. Bharat Electronics, but mostly nationalised e.g. Mazagon Dock, Hindustan Aeronautics) were brought under the administrative control of the Ministry of Defence because they were expected to engage primarily in production to meet defence requirements. This trend became more obvious in the 1960s when serious efforts to acquire self-sufficiency in this field got underway.

The object of this Chapter is to examine the performance of the Defence Research and Development as well as production organisations and attempt to establish whether the numerous official statements about the achievement of self reliance are borne out by facts.

The defence production sector at present consists of:

A. 31 Ordnance Factories including 5 in the Ordnance Equipment Factories (OEF) Group.

B. Defence Public Sector Undertakings (DPSUs) comprising 9 major companies under the administrative control of the Department of Defence Production.

The production efforts of the Ordnance Factories and the DPSUs during the 1964-78 period shall also be examined.

DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION

The Defence Research and Development Organisation (DRDO) has a two-tier organisational structure:

1. The headquarters, responsible for policy planning, control, co-ordination and liaison with the armed forces.
2. A field network at present consisting of 31 R and D establishments and laboratories apart from a work study institute and evaluation and analysis groups.

The entire organisation is under the Director General of Defence Research and Development, who is also the Scientific Adviser to the Defence Minister and an ex-officio Secretary in the Ministry of Defence. In practice, 5 per cent of the organisational effort is devoted to basic research, 35 per cent to applied research and 60 per cent to development.[1]

For policy direction at the top governmental level, a Defence Research and Development Council, with the Defence Minister as chairman, was created in 1962[2] and it was only

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[1] A. Rehman et.al., 'The Financing of Scientific and Technological Research in India' in The Role of Science and Technology in Economic Development, Science Policy Studies and Documents, No.18 (Paris: UNESCO, 1970), p.191.

[2] National Science Policy and Organisation of Scientific Research in India, Science Policy Studies and Documents, No.27 (Paris: UNESCO, 1972), p.33.

after this that emphasis on Defence R & D increased. This is evident by the fact that the R & D budget increased from Rs.520 million in 1962-63[3] to about Rs.1,600 million in 1969-70.[4] In 1965-66 a new Apprentice Scheme was introduced for the recruitment of civilian scientists and work during this period was concentrated on development of items like grenades, mines, HF and VHF Sets, generating sets etc. The next few years saw further expansion of the R & D effort as research problems began to be given to various other institutions and universities. But there seems to have been a degree of lack of co-ordination between the DRDO and the various production establishments since, for example in 1969-70, the DRDO had to undertake pilot production of as many as 51 items developed by them as either the quantity required was too small or no production base was available.[6]

There would also seem to have been a lack of perspective planning during this period as it was only in 1969-70, that a five year R & D plan was drawn up. This plan catered for an increase in expenditure from Rs.1,600 million in 1969-70 to about Rs.3,000 million (including civil works) by 1973-74.[7] In 1970-71 it was decided that

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3 Report 1971-72, p.103.

4 Report 1969-70, p.63.

5 Report 1965-66, pp.58-59.

6 Report 1969-70, p.65.

7 ibid., p.63.

the plan would be based on the 'Roll-On' concept[8] and it is from this time that there is evidence to suggest that attempts were made to outline R & D priorities and steps taken to streamline the organisational structure. Emphasis was to be laid on missile development and on the development of strategic materials, particularly metals and alloys required in the production of aircraft, missiles and electronics. A separate Aeronautics R & D Board was constituted and for the co-ordination of radar and communication (electronics) activities a new planning unit was formed. In an obvious effort to expand the R & D base, it was also decided that the Defence Public Sector Undertakings (DPSUs) and Ordnance Factories would have their own in-house R & D facilities.[9]

However, these initial attempts at long term planning do not seem to have been very successful. After announcing that a 5-year roll-on plan had been introduced in 1971-72, the Ministry of Defence Report went on to reveal that a 7-year plan for the period 1972-79 was under preparation. That since a good R & D base to undertake research in conventional fields had already been built, emphasis would now shift to research on missiles, liquid and inertial navigation systems, naval underwater weapons, and radar technology.[10]

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[8] Report 1970-71, p.67.

[9] Report 1972-73, p.82.

[10] ibid., pp.82-86.

Even this plan had problems of implementation because the very next year, in 1973-74, a new plan covering the 1974-79 period was drawn up. Measures were also taken to associate producer organisations in early stages so that the R & D efforts were 'consistent with the constraints of industry'.[11] Although long overdue, steps to co-ordinate R & D with production capabilities were finally initiated.

Thus, it is only in the 1970s that the DRDO has been able to achieve, albeit haltingly, a certain degree of co-ordination. The R & D infrastructure has also developed and links have been established with various other R & D establishments in the country like the Council for Scientific and Industrial Research (CSIR), Atomic Energy Commission (AEC), Departments of Electronics (DE), Science and Technology (DSST) and various institutes of technology and science which undertake research on projects farmed out by the DRDO.[12] The expenditure by the DRDO itself has shown a consistent increase over the years, from Rs.2,537 million in 1972-73 and Rs.4,830 million in 1975-76 to an estimated Rs.5,184 million (1977-78).[13]

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[11] Report 1973-74, p.89.

[12] For instance, the Plan allocations for Defence Projects undertaken by the Department of Electronics have increased from approximately Rs.2 million in 1975-76 and Rs.8.3 million in 1976-77 to the present (1978-79) estimated expenditure of Rs.18.1 million. See, Govt. of India, Department of Electronics, Performance Budgets 1976-77 and 1978-79.

[13] Govt. of India, Defence Services Estimates 1977-78.

Although the results of the R & D efforts have been far from spectacular, there has been some contribution towards attaining the goal of self-sufficiency. Indigenously developed 105 mm., 120 mm. guns, 75/24 mm. pack howitzer and 57 mm. Anti-Tank guns are now in regular production. Besides, ammunition and spares for various imported weapons and other equipment are being manufactured indigenously. Battlefield surveillance radars, VHF sets and electronic secrecy equipment have also been developed locally.[14]

In recent years, further progress has been made and development of more sophisticated equipment has been undertaken. Items like training simulators for two 'existing aircraft', and advanced gas turbine engine, and armour material for tanks are currently under development. A locally developed rocket for the Navy is expected to go into production shortly and a pilot plant for the production of rocket fuel is also in advanced stages of planning.[15] But, while the R & D capability of the DRDO is expected to improve further in future years, the scanty information available indicates that difficulties still persist in upgrading laboratory level technologies to a commercial scale.

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[14] Report 1971-72, pp.105-106.

[15] Report 1977-78, pp.94-99.

ORDNANCE FACTORIES

Ordnance factories in India have a relatively long history, and the first ones were established by the British long before independence. Nevertheless, substantial development and expansion occurred mainly in the post-1962 period and specially as a result of the First National Defense Plan drawn up in 1964 which had a composite 5-year outline for modernisation and expansion of Ordnance Factories at an estimated cost of Rs.332 million with a foreign exchange component of Rs.152 million.[16]

Six new factories were envisaged in the first phase of the expansion scheme but since the plan itself was heavily dependent not only on foreign exchange but also on foreign technical assistance, adherence to the program was minimal. Formally opened on October 15, 1964, the Varangaon small arms ammunition plant was formerly the St. Louis Ammunition Factory provided by the United States,[17] which also furnished consultancy services for the Ordnance Factory at Ambajhari,[18] producing 81 mm. mortar shells. Although the latter was planned on the basis of U.S. aid under the Military Credit Sales Program, U.S. military assistance was suspended as a consequence of the 1965 war and the factory was eventually set up without foreign aid.[19]

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[16] Report 1964-65, p.51.

[17] Lorne J. Kavic, India's Quest for Security: Defence Policies 1947-1965, p.205.

[18] Report 1964-65, p.54.

[19] Report 1965-66, p.38.

Likewise the filling factory at Chandrapore was also adversely affected by the suspension of British aid in 1965 and equipment and machinery were subsequently obtained by expenditure of free foreign exchange.[20] The Bhandara Filling Factory which began production in January 1965 was set up with British assistance at a cost of Rs.160 million.[21]

Possibly as a consequence of the stoppage of Western aid after 1965, and also due to the high costs, particularly the foreign exchange content, the government abandoned plans to set up the Burla Explosives Factory and the Panvel Propellant Plant which were together estimated to cost Rs.620 million including Rs.200 million in foreign exchange. The requirements, it was argued, would be met by stockpiling.[22] Nevertheless, the government did go ahead and set up the small arms factory at Tiruchirapalli at a cost of Rs.130 million, designed and built totally by Indian technicians.[23] Formally inaugurated on July 3, 1966, this factory highlights the basic problem of defence production in India - the vast gap between initial requirement and long term needs. Three lines of production had been envisaged - carbines, 7.62 mm. rifles and light

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20 ibid.

21 Lorne J. Kavic, p.205.

22 Statement of Minister of Defence Production, A.M. Thomas, as reported in Times of India, December 20, 1964. See also Report 1964-65, p.54.

23 Times of India, July 4, 1966.

machine guns. All the three items were already in production - rifles at Ishapur, carbines and LMGs at Kanpur, so Tiruchirapalli was meant to supplement production.

Eventually, this unit ended up manufacturing only carbines, not only because of the slackening of demand as army re-equipment got well under way, but also because of technical bottlenecks and lack of production equipment.[24] Assistance from the civil sector sought in this context[25] does not seem to have been very effective, primarily because of lack of technical sophistication.

Besides the setting up of these factories, a number of new items like medium and heavy mortars, recoilless anti-tank guns and related ammunition for the Army, bombs and 30 mm. ammunition for the Air Force etc. were also taken up for manufacture in the Ordnance factories already in existence. Items previously imported, parachutes for example, were now manufactured indigenously. The late 1960s also saw the beginnings of export attempts by Ordnance factories, clothing and other Army software in the first instance, as domestic orders were completed. The foreign exchange earnings of Ordnance factories since they first undertook exports (1966-67) till 1971-72 for instance amounted to Rs.270 million.[26] Profit from the manufacture

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[24] Dilip Mukerjee in Times of India, October 31, 1970.

[25] Report 1966-67, p.40.

[26] Report 1971-72, p.77.

of civil trade items in 1969-70 for example, was Rs.8.851 million.[27]

Despite the increase in production during this period two major shortcomings persisted (a) this increase was confined mostly to small arms and ammunition and non-lethal stores; (b) due to the emphasis in setting up new units, modernisation of the already existing units tended to be neglected. This situation was further aggravated by the increasing pressure on already scarce resources and consequently a modernisation program in real earnest began only in the 1970s, with a project for the Ammunition Factory and Explosives Factory being approved in 1971-72 at an estimated cost of Rs.60.5 million and Rs.97.7 million respectively in the first stage.[28] In 1972-73, the Cordite Factory at Aravankadu and the Metal and Steel Factory at Ishapur were also included,[29] but further details of the program, which is said to involve a total outlay of Rs.320 million,[30] are not known.

In the early 1970s further expansion of the defence production effort has also taken place. Items like Air-Air Air-Surface rockets, 30 mm. Aden gun barrels (for use in Gnat/Ajeet aircraft), 1,00 lb bombs for the Air Force,

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27 Report 1970-71, p.38.

28 Report 1971-72, p.74.

29 Report 1972-73, p.48.

30 Economic Times (Bombay), January 16, 1975.

4", 4.5" and 6" ammunition, anti-submarine rockets for the Navy have been taken up for manufacture. Self-sufficiency has been achieved not only in small arms, but also in items like field and mountain guns, anti-aircraft guns.[31]

This is, however, the result of a planning and decision-making process which leaves much to be desired. Plans have often gone awry and the same can perhaps be said of decisions and implementation. The Indian designed 105 mm. field gun, for example, was tested in the early 1960s but the project for its manufacture was sanctioned only in October 1971 (at an estimated cost of Rs.486.8 million).[32] This was a time when the necessity to replace the WWII 25 pounder with this gun was supposedly very urgent, so manufacture of this weapon for the interim period, it was decided in 1973-74,[33] would be undertaken using existing capacity for the manufacture of other guns. Production of the 105 mm. field gun finally commenced in 1974-75, 4 years after the original decision and it was expected that regular manufacture would begin by about 1977.[34] Likewise, the project for an alloy and special steels plant, which was being planned as early as 1961-62,[35] was finally sanctioned in November 1971.[36] Being set up at Kanpur at

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31 Report 1975-76, p.29.

32 Report 1972-73, p.47.

33 Report 1973-74, p.46.

34 Report 1974-75, pp.50-51.

35 Report 1961-62, p.36.

36 Report 1972-73, pp.46-47.

an estimated cost of Rs.480.1 million, it is still not known when production will begin. In the meantime however, most of the alloy and special steel requirements for the manufacture of ordnance hardware continue to be imported. Likewise, the propellant and ballistics project, which was shelved in 1964-65, was finally sanctioned in 1970, and went into production in 1975-76.[37] The indigenous manufacture of ammunition for the 130 mm. Soviet guns which were imported in the mid-1960s, was sanctioned as late as 1973-74,[38] and production of this ammunition (till then imported) was expected to begin in 1977.[39] Manufacture of 9 mm. pistols and 7.62 mm. medium machine guns (for infantry and armour roles) sanctioned in September 1971 was also likely to begin in 1977.[40] Not surprisingly, none of these projects have commenced production in 1977-78.[41]

Vehicles:

Three different types of vehicles have been in production in the Ordnance Factories.

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37 Report 1975-76, p.30.

38 Report 1973-74, p.46.

39 Times of India, August 19, 1974.

40 ibid.

41 Report 1977-78, p.34.

1. The three-ton Shaktiman trucks in collaboration with Maschinenfabrik Augsburg-Nürnberg AG (M.A.N.) of the Federal Republic of Germany.[42]
2. Nissan one-ton trucks and Nissan Patrol Jeeps (referred to as 'Jongas' in India) in pursuance of collaboration agreements signed with Nissan Motor Company of Japan in 1960-61.[43]

In the early sixties these vehicles (with the exception of Shaktiman) were more or less being assembled in India. For example in 1963-64, the indigenous content of Nissan one-ton, Nissan Patrol and Shaktiman trucks was 35 per cent, 28 per cent and 61 per cent respectively.[44] Indigenous content of these vehicles tended to increase somewhat in the following years, but a separate factory for the manufacture of these vehicles was established, as late as 1970[45] at an estimated cost of Rs.160 million, where the assembly of Nissan Patrol and Nissan one-ton vehicles commenced in March and November 1970 respectively, that of Shaktiman 3-ton trucks in late 1971-72, and regular production in 1973-74.[46] Even then, engine blocks and

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[42] This was undertaken in September 1959 after reported Government dissatisfaction with the performance of private Indian suppliers and the first truck rolled off the assembly line at the Gun Carriage Factory at Jabalpur on June 21, 1959. See Lorne J. Kavic, p.129.

[43] ibid., p.130.

[44] Report 1964-65, p.53.

[45] Consequent to a decision taken in 1965-66.

[46] Times of India, September 19, 1970.

castings for the above vehicles continued to be imported because of lack of a captive foundry, which was established only in the mid-1970s.

As of 1976-77, the indigenous content of the Shaktiman, Nissan 1-ton and Nissan Patrol was approximately 94 per cent, 80 per cent and 82 per cent respectively[47] - not a very creditable performance, considering the fact that they have been in production for over 15 years, and were expected to be completely indigenised by 1977.[48]

Tanks:

In January 1961, a team headed by the then Chief of Army Staff, Lt. Gen. L.P. Sen visited F.R.G. and Britain to select a suitable tank for domestic production. Turning down an offer by a subsidiary of Daimler-Benz to design a tank suited to Indian conditions, the proposal of Vickers-Armstrong (U.K.) to modify the Chieftain to Indian specifications was accepted. Of a planned production of 1,000, the first 40 units were to be built in Britain; components of subsequent units were to be shipped to India for assembly at a plant set up at Avadi, where they would ultimately be manufactured.[49]

The first Vijayanta (modified Chieftain) tank rolled off the assembly line in the last week of December, 1965[50]

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47 Report 1976-77, p.30.

48 Report 1975-76, p.30.

49 Lorne J. Kavic, pp.130-131.

50 Report 1965-66, p.42.

but only 20 units were reported to have been produced in 1967-68.[51] Set up to have a capacity to manufacture 100 tanks per year,[52] the Heavy Vehicles Factory at Avadi has obviously not been able to attain this rate of production,[53] resulting in heavy imports from the Soviet Union.

Problems have been many - ranging from insufficient domestic armour production capability to lack of subcontractors willing to manufacture various parts. There also seems to have been a shortage in the production of its 105 mm. main gun[54] which resulted in imports from Australia.[55] There were also problems with indigenisation; of the raw materials required, some were not available in the country; of others the quantity required was too small to justify local manufacture, or production fell short of requirements.[56] Nevertheless, the indigenous content by value rose from 60 per cent in 1970-71[57] to 65 per cent in 1971-72[58] and is now reported to be about 94-95 per cent.[59]

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51 SIPRI. Arms Trade with the Third World (Stockholm: Almqvist & Wiksell, 1971), p.743. (Hereafter cited as Arms Trade with the Third World).

52 Minister of Defence Production, A.M. Thomas, as reported in Hindu (Madras), November 9, 1964.

53 According to Jane's Weapons Systems 1978, 'over 600' tanks have been produced in over 10 years of their manufacture.

54 Report 1974-75, p.51.

55 International Defense Review 6/1976, p.1030.

56 Dilip Mukerjee in Times of India, October 26, 1970.

57 Report 1970-71, p.42.

58 Report 1971-72, p.74.

59 SIPRI Yearbook 1978, p.215. See also Overseas Hindustan Times, July 13, 1978.

However, as discussed earlier, due to the unsatisfactory performance of the Vijayanta, its future manufacture would seem to be uncertain.[60]

Besides tanks, various other modifications based on the Vijayanta chassis i.e. armoured recovery vehicles, and self propelled guns, developed by the Defence Research and Development Organisation (DRDO) at Avadi have also gone into production. Progressive development and indigenous manufacture of armoured personnel carriers has also begun.

DEFENCE PUBLIC SECTOR UNDERTAKINGS (DPSUs)

The 9 companies in this sector can be subdivided into two categories:

1. Companies where production primarily caters to defence customers while also undertaking manufacture of items for civil use. These would consist of
   a. Hindustan Aeronautics Ltd.
   b. Bharat Electronics Ltd.
   c. Mazagon Dock Ltd.
   d. Bharat Dynamics Ltd.
   e. Mishra Dhatu Nigam Ltd. (still to begin production).
2. Companies which manufacture primarily civil equipment with only marginal production for defence purposes.
   a. Goa Shipyard Ltd.
   b. Garden Reach Shipbuilders & Engineers Ltd.

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[60] See Chapter II, pp.37-38 in this thesis.

c. Praga Tools Ltd.

d. Bharat Earth Movers Ltd.

HINDUSTAN AERONAUTICS LIMITED (HAL), BANGALORE

The Hindustan Aircraft Limited was established in December 1940 as a limited company owned jointly by the Government of Mysore and Walchand Hirachand with the Government of India joining in as a shareholder by purchasing the entire interest of the latter in 1941. Its original program was the assembly of Harlow trainers (August 1941) and Curtiss Hawk fighters (July 1942) but during the Second World War, the factory was transformed into a Repair/Overhaul Base and aircraft production was suspended. In 1948, the Company took up the design and development of the Basic Jet Trainer HT-2, completing it in 1953, and, besides other projects, also undertook the assembly and manufacture under licence of Vampire Jet Fighters and Prentice Trainers. In 1957, the manufacture under licence of Gnat fighters and Orpheus engines was taken up, and in 1959 that of Dart engines for the Avro-748 (later called HS-748) transport aircraft being manufactured by the Aircraft Manufacturing Depot at Kanpur (set up in 1959).

In August 1963, Aeronautics India Limited, a public sector company, was formed to establish and manage the three factories for the manufacture of MiG-21 aircraft. In an attempt to streamline the aircraft industry, Hindustan

Aircraft and Aeronautics India were merged on October 1, 1964 and the new company re-designated as Hindustan Aeronautics Ltd. (HAL) which also took over the Aircraft Manufacturing Depot, Kanpur. Also, the Railcoach Division of the Hindustan Aircraft Division was separated and transferred to the management of Bharat Earth Movers Limited w.e.f. January 1, 1965.

Currently, the following types of aircraft and aero-engines are being manufactured by the company:

(a) Aircraft:

HJT-16 KIRAN	-	Basic jet trainer, designed and developed by HAL.
AJEET	-	Fighter aircraft, improved version of GNAT, developed by HAL.
BASANT	-	Single seat agricultural aircraft designed and developed by HAL.
CHETAK (ALOUETTE III)	-	Multipurpose helicopter being manufactured under licence.
CHEETAH (SA 315)	-	Light helicopter for AOP role in the Himalayas, being manufactured under licence
HS 748 MF	-	Military freighter version of the twin engined transport aircraft manufactured under licence.

After a recent restructuring of its organisation of HAL now consists of three complexes:

1. Bangalore Complex: which comprises the following units:

a. Airframe and Aircraft Assembly: Produces the Ajeet interceptor/ground attack fighter, the Kiran (HJT-16) jet trainer and also overhauls various types of aircraft.

b. Aeroengine Factory: Produces the Artouste III-B turboshaft helicopter engines in collaboration with Turbomeca (France), the Orpheus 701 and 703 turbojet engines for Ajeet and Marut fighters, the Orpheus 70102 (derated 701) used as a thrust booster for the Fairchild Packet transport aircraft, and the Dart 531 turbo-prop engines used in the HS-748 - all in collaboration with Rolls Royce (U.K.)

c. Design Complex: This division has in the past designed (i) the Marut ground attack fighter and trainer versions; (ii) the Kiran HJT-16 jet trainer; (iii) Basant agricultural aircraft and (iv) the Ajeet interceptor. The unit is now working on the development of the following aircraft: (i) HPT-32, a two seater piston engined aerobatic/ trainer; (ii) Kiran MKII, a variant of the Kiran MKI designed for armament training and counter-insurgency role; (iii) Ajeet trainer; (iv) HF24 variant which is intended to be an improvement over the Marut, in that it will have double the payload and endurance capability; (v) Advanced Light Helicopter, being designed in collaboration with Aerospatiale (France).

d. Helicopter Division: Manufactures the 7-seater Chetak (Al-III) and the 5-seater Cheetah (SA-315) helicopters in the transport, armed and agricultural versions, in technical collaboration with Aerospatiale.

2. The MiG Complex: Consisting of three divisions:

(i) Nasik Division: Manufacture of airframes and aircraft assembly.

(ii) Koraput Division: Production has centred on the R-11-F2-300 engine for the MiG-21 FL and the R-11-F2S-300 engine for the MiG-21M.

(iii) Hyderabad Division: Electronics and A-A missiles for MiG-21.

3. Accessories Complex: Consists of

(i) Lucknow Division: Manufactures brakes, wheels, instruments, ejection seats etc., under licence.

(ii) Hyderabad Division: Electronics Factory. Manufactures equipment for MiG aircraft besides others, under licence.

Each of these complexes is headed by a separate Managing Director. Besides these, there is the Kanpur Division which produces the HS-748 aircraft, under a General Manager who reports directly to the Chairman.

HF-24 MARUT

This project was taken up in 1956[61] under the direction of Dr Kurt Tank,[62] the initial plan being to use two Orpheus

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61 Dilip Mukerjee in Times of India, October 24, 1970.

62 The German aircraft designer who designed the FW 190.

703 turbojet engines for the transonic MkI version and a single Orpheus 12 turbojet for the supersonic MkII airframe.[63] The first prototype MkI flew in June 1961 followed by second prototype MkI in October 1962.[64] As far as the MkII was concerned, it never really got off the ground because of the lack of a proper engine. India turned down the offer by Bristol to develop the Orpheus 12 provided the former accepted the financial liability,[65] and unsuccessfully experimented with Soviet Klimov VK-7 turbojet and the RD9-F engines, spending about $3 million on these abortive programs.[66] Unsuccessful attempts were also made to use the Egyptian E-300 turbojet.[67] Subsequently, India is reported to have sought help from British and American sources and representatives from Rolls Royce and experts from the USAF research and development centre at Dayton, Ohio visited India in July 1964. However, the Indo-Soviet agreement in September 1964 on the MiG project virtually ended all chances of Western aid.[68]

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63 The Orpheus 12 engine was being developed by Bristol for the NATO competition and its completion was subject to its acceptance by NATO countries. See Arms Trade with the Third World, p.745.

64 Jane's All the World Aircraft, 1973, p.745.

65 Dilip Mukerjee in Times of India, October 24, 1970.

66 For an excellent discussion of the politics of the HF-24 program see Arms Trade with the Third World, pp.745-748.

67 ibid.

68 Lorne J. Kavic, India's Quest for Security, p.205.

The first of 18 pre-production Maruts (HF-24 MkI) flew in March 1963 and a token delivery was made to the IAF on May 10, 1964,[69] but the first flight of the series production Marut could take place only on November 15, 1967.[70] The following table indicates the delays in the delivery schedule of the aircraft in the 1960s:

	1964-65	1965-66	1966-67	1967-68	1968-69
First aircraft delivery schedule	6	10	24	22	-
First modification	7	11	30	14	-
Second modification	-	-	18	18	18
Third modification	-	-	6	10	18
Actual delivery	1	6	1	8	

Source: Arms Trade with the Third World, 1973, p.748.

However, 125 Maruts were said to have been built by January 31, 1977[71] and the production program seems to have ended[72] in late 1977 as scheduled.[73]

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69 Jane's All the World Aircraft, 1973, p.745.

70 ibid.

71 ibid.

72 N.N. Sachitanand in Hindu (Madras) International Edition, July 29, 1970.

73 David A. Brown in Aviation Week & Space Technology, January 17, 1977, p.15.

In 1967, design work was also initiated on the HF-24 Marut IT, 2 seat tandem trainer[74] and the first prototype began test flights on April 30, 1970 followed by a second prototype in March 1971.[75] In all 15 trainers had been delivered to the IAF by January 31, 1977.[76] Two prototypes of what have been referred to as the reconnaissance version of the Mark I using the Orpheus 703 equipped with after-burner giving Mach 1.4 capacity were also built, but further work seems to have been stopped after one was lost in an accident in 1969.[77]

Overall, the HF-24 program has been far from successful, with the aircraft being able to join squadron service more than 10 years after development actually began. Meanwhile, as mentioned earlier, the Design Complex is working on a Variant model (HF-25) and the Gas Turbine Research Establishment (GTRE) at Bangalore is reported to

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74 SIPRI Yearbook 1973, p.365.

75 Jane's All the World Aircraft, 1973, p.745.

76 ibid. There is however some controversy as to how many trainers were actually ordered/delivered. SIPRI Yearbook 1973 states that 'by mid-1972 firm Air Force order for 25 planes for delivery from 1974', (p.365) while SIPRI Yearbook 1977 says that 10 had been required by the Air Force and produced (p.290). SIPRI Yearbook 1978 states that of a total requirement of 20, 10 have been delivered and 'production may terminate'. In any case whatever be the total number produced, production 'has been phased out'. Refer N.N. Sachitanand, n.72 above.

77 SIPRI Yearbook 1973, p.365. See also Dilip Mukerjee, n.61 above.

have developed the GTX series of engines,[78] different versions of which will be used for the HF-25 MkI and HF-25 MkII variants.[79] Design work is also said to be in progress since 1969 on an advanced version multi-role combat aircraft designated HF-73 Marut MkIII, with the prototype scheduled to fly in 1980. But the proposal to power the HF-73 with twin Rolls Royce RB199 turbojets is reported to have been unfeasible for both financial and technical reasons.[80]

MiG-21

The project for the manufacture of the MiG-21 in India is said to have resulted indirectly from the interes- in acquiring a Soviet power plant for the HF-24,[81] after unsuccessful attempts at acquiring American F-104 aircraft for the IAF in 1964.[82] The phased program of production outlined by Mr A.M. Thomas, the Minister for Defence Production, in 1965 was as follows:[83]

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[78] These are said to have a very high thrust to weight ratio and are reported to be comparable to the Mirage's Ater turbojet in power i.e. in the 7,200 kg (15,870 lb) thrust class. International Defense Review, 2/1976, p.308.

[79] It is reported that GTS-14U will be retrofitted to the MiG-BIS and HF-25 MkI and GTX 37-14UB, a by-pass version of the former would be suitable for the HF-25 MkII. Ref. N.N. Sachitanand, n.72.

[80] International Defense Review, 4/1976, p.535.

[81] Arms Trade with the Third World, p.748.

[82] For a detailed discussion of the efforts at F-104 acquisition and the subsequent decision to establish the MiG Project see Lorne J. Kavic, pp.198-200.

[83] As reported in Times of India, March 9, 1965.

Phase I : From major assemblies. Commencing 1966.

Phase II : From sub-assemblies.

Phase III : From detailed parts.

Phase IV : From raw materials. Commencing 1969-70.

Production under Phase I assembly from imported components of the program began in late 1966, with the first deliveries to the IAF in 1967. About 100 were assembled in this way.[84] Even at the early stages the project seems to have run into considerable trouble, including a shortage of trained technicians and problems of translating technical documents from Russian.[85] Three factories were envisaged for the MiG complex: Nasik (airframes), Hyderabad (electronics and later A-A missiles) and Koraput (engines). The last of these did not enter production until December 1968 and no HAL-'built' engines were installed in HAL-assembled aircraft before 1969. Even after this, in 1970 also the output of engines was reported to be well below capacity.[86] The first MiG-21 FL built from 'raw materials' was handed over to the IAF on October 19, 1970.[87] Production of this model was said to have ended in 1973 and is believed to have totalled 196.[88]

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[84] Jane's All the World's Aircraft, 1977-78, p.85. These were the MiG-21 FL, Soviet export designation of the MiG-21 PF.

[85] Dennis Childs and Michael Kidron, 'India, the USSR and the MiG Project', Economic and Political Weekly, December 22, 1973, p.1724 quoting the HAL Annual Report, 1965-66.

[86] ibid.

[87] Times of India, October 19, 1970.

[88] Dilip Mukerjee in Times of India, October 24, 1970.

In 1972 an official Indian team left for Moscow to finalise arrangements for the production of the MiG-21M which was expected to begin in 1973-74.[89] The first HAL 'built' MiG-21M was handed over to the IAF on February 14, 1972[90] and about 15 were reported to have been delivered by Spring 1974.[91] Also the Soviet terms for licence production seem to have been changed as licence payments were reported to be no longer payable in kind, but in dollars.[92] Indigenisation too, is reported to have proceeded rather slowly since the first MiG-21M produced 'entirely' at the Nasik Division (Airframe and assembly) was handed over to the IAF in December 1975.[93]

An improved version of the MiG, the MiG-21MF (Fishbed J) having the more powerful Tumansky R-13-300 turbojet and increased fuel capacity is now expected to be taken up for production.[94]

Overall, the program for MiG production has not been very successful, which is not at all unusual taking into consideration the HF-24 and the HJT-16 experience. The

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89 Times of India, Jnauary 13, 1972.

90 Times of India, February 15, 1973.

91 Refer n.88. Because of this shortfall, 50 Soviet built MiG PFMA's had to be imported to supplement Indian production.

92 SIPRI Yearbook 1973, p.363.

93 Times of India, December 2, 1975.

94 Jane's All the World's Aircraft 1977-78, p.45. Earlier reports that the IAF might take up the Rolls Royce offer to re-engine MiG-21s with Spey engines were discounted in India because it was considered that despite the advantages the investment made in HAL's Koraput (Engine) Factory was too great to be discarded as also the cost and time scale of such a modification would be prohibitive. See International Defense Review, 2/1976, p.308.

production rate has been about 10-15 aircraft per year[95] as against an estimated capacity of 30 aircraft per year.[96] The basic unit cost of an Indian-made MiG was estimated at Rs.11.6 million, as against the estimated import price of about Rs.6 to Rs.7.5 million.[97] In 1971-72 the foreign exchange content of aircraft then in production was between 30 and 55 per cent[98] and an estimated Rs.7 million in terms of value.[99] Hence the program does not seem to have resulted in large savings in foreign exchange, nor in any substantial degree of self reliance. Although MiGs currently in production have an estimated indigenisation level of about 60-70 per cent,[100] there is near total reliance on external sources (i.e. Soviet Union) with regard to raw materials like special alloys and steels, as well as some of the electronics. Consequently, it would be reasonable to conclude that the MiG project still remains dependent on Soviet supplies, in that it would come to a halt if the latter

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95 Flight International, March 18, 1978, p.756.

96 Arms Trade with the Third World, p.725.

97 ibid. The unit cost has been calculated on the basis of sales and production figures for 1972-73. The USSR sales price (as given in Arms Trade with the Third World, p.739) is further substantiated by their calculations of the unit sales price of the first 39 aircraft which were only assembled in India, amounting to Rs.7.7 million per aircraft.

98 ibid. Quoting statement of O.P. Mehra, Chairman of HAL.

99 ibid., p.1726.

100 SIPRI Yearbook 1978, p.216.

were withdrawn. There do not seem to have been any visible spin off benefits in the form of growth of design or production capability based on the MiG experience, which has been a closed one with theSoviet Union not even supplying India with any detailed design or type approval data.[101]

HJT-16 KIRAN

Development of the HJT-16 Kiran two-seat basic jet trainer was sanctioned in December 1959, and detailed design work began in April 1961.[102] The first prototype flew for the first time on September 4, 1964, followed by a second aircraft in August 1965.[103] But the series production of the aircraft has been much behind schedule, due to material shortages.[104]

HJT-16 delivery schedule:*

	1965-66	1966-67	1967-68	1968-69	1969-70
First schedule	9	15	-	-	-
First modification	3	15	27	15	-
Second modification	-	7	18	27	8
Third modification	-	-	6	16	24
Fourth modification	-	-	-	7	11

* Actual delivery by 1969.1

Source: Arms Trade with the Third World, p.752.

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101 Arms Trade with the Third World, p.749. It is also said that 'requests for the supply of these from the Indian side have been turned down'.

102 Arms Trade with the Third World, p.752.

103 Jane's All the World's Aircraft, 1977-78, p.80.

104 SIPRI Yearbook 1973, p.367.

Consequently, by mid-1970 only about 40 HJT-16 had been completed[105] and a total of 113 by January 31, 1977.[106]

Along with the development of the HJT-16 Kiran, work had also begun on the HJE-2500 turbojet engine for the trainer,[107] which was expected to replace the Rolls Royce Bristol Viper II turbojet engine from the 100th aircraft in 1974-75.[108] But subsequently it was decided to re-engine the Kiran with the HAL-built Orpheus 701 engine derated to 3,500 lbt (1590 kp), thus putting an end to the chances of the 2,500 lbt HJE-2500 going into production.[109] It was also decided that the 116th and subsequent aircraft (designated MkII) be fitted with a hard point beneath each wing capable of carrying weapons or drop tank[110] for armament training and the counter-insurgency role.

The first prototype of the HJT-16 Kiran MkII fitted with derated Orpheus 701 was fabricated in 1975-76[111] and made its first lfight on July 30, 1976,[112] but flight testing

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105 ibid.

106 Jane's All the World's Aircraft 1977-78, p.80.

107 Arms Trade with the Third World, p.752.

108 SIPRI Yearbook 1973, p.367.

109 International Defense Review, 6/1975, p.925. the Orpheus 701 as fitted on the Gnat develops 4,520 lbt (2,050 kp) thrust for takeoff, compared to only 2,500 lbt (1,135 kp) of the Viper II.

110 Jane's All the World's Aircraft 1977-78, p.80.

111 Report 1976-77, p.50.

112 Report 1977-78, p.62.

was suspended later that year, following some engine intake problem, and was scheduled to start again in early 1977.[113]

GNAT MkI/AJEET

The licence for indigenous production of Gnat MkI aircraft was acquired in September 1956[114] along with the supply of 23 British built MkIs and 20 sets of components in 1958-60.[115] The first Gnat MkI assembled in India flew for the first time on November 18, 1959, the first built fully by HAL on May 21, 1962 and full production began in 1963.[116] Successive orders for 100, 43 and 50 aircraft were completed with the last one being delivered on January 31, 1974.[117] By 1972 the indigenous content of the Gnat airframe and engine was about 85 per cent and 60 per cent respectively and was expected to rise further.[118]

A total of 215 aircraft were produced with the last two being used as prototypes for the MkII version - the Ajeet.[119] Begun as the Gnat MkII in June 1972, this developed version was then renamed Ajeet and unlike the MkI (interceptor)

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113 Refer n.103.

114 Arms Trade with the Third World, p.751.

115 Jane's All the World's Aircraft 1975-76, pp.102-103.

116 ibid.

117 ibid.

118 Arms Trade with the Third World, p.751.

119 Jane's All the World's Aircraft 1975-76, p.103.

is being produced primarily for the ground attack role.[120] The first Ajeet prototype, a Gnat with less than the full range of modifications, first flew on March 6, 1975 and the second prototype on November 5, 1975 followed by the first production Ajeet on September 30, 1976.[121] Besides increased combat capability, the aircraft has updated avionics including new VHF equipment being produced by BEL under Bendix licences[122] and the new Ferranti ISIS195 (Integrated Strike and Interception System) two-axis rate gyro gunsight which is to be licence-produced by HAL's Lucknow Division.[123] Although the import content of this aircraft is not known, it is reported that various components are being imported.[124] It is also reported that HAL is likely to update some of the recent Gnats to the Ajeet Standard.[125]

Although production of the Ajeet began in 1975-76[126] and deliveries (against an order of 100) were expected to

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120 H.P. Mama, 'Ajeet - The IAF's New Ground Attack Fighter', International Defense Review, 6/1977, p.1088.

121 ibid.

122 ibid., p.1090.

123 International Defense Review, 3/1978, p.447. This gunsight also equips the HF-24 Marut and will be fitted to the armed Kiran MkII.

124 These include aileron power control units, landing gear retraction jacks, filters, flow restrictors, foot brake pumps and various types of valves to be supplied by Automatic Products Ltd. (U.K.). See International Defense Review, 5/1975, p.766.

125 Refer H.P. Mama, n.120, p.1090.

126 Report 1976-77, p.49.

begin in Spring 1977,[127] problems related to 'development and productionising of the aircraft' were encountered in 1976-77,[128] making a delay in the aircraft delivery schedule seem very likely.

The project for the Ajeet tandem trainer version was also sanctioned in February 1976. The first prototype is expected to fly in late 1979 and the first production model around 1981.[129]

HS-748

Agreement for the manufacture under licence of the HS-748 was signed with Hawker Siddeley (U.K.) on July 7, 1959 and that for its power plant, the Rolls Royce Dart RDa 7 Mk531 turboprop engine on December 30, 1959. The project seems to have been taken on without any planning[130] at the (then) Aircraft Maintenance depot at Kanpur which could not devote sufficient effort to the production program while at the same time its repair and overhaul facilities were also said to have suffered when needed most i.e. during

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127 Jane's All the World's Aircraft 1977-78, p.84.

128 Report 1977-78, p.61.

129 Refer n.122.

130 Arms Trade with the Third World, p.751. It is also reported that the then Defence Minister Krishna Menon wanted the first Indian-assembled HS-748 to fly even before the first prototype did in U.K. (G.K. Reddy, Times of India, August 11, 1964). Work began in 1960 but sanction for the buildings was not given till 1963 and as a result, even in 1964, simultaneous construction and production was going on in some hangers.

the conflicts with China and Pakistan.[131] The program is reported to have been further delayed due to 'funding and material problems'.[132]

The first four HS-748s were Series 1 aircraft using imported components, and the first one flew on November 1, 1961, followed by a second one on March 13, 1963.[133] The first of the Series 2 aircraft flew on January 28, 1964 and by the end of 1964, 4 had been manufactured,[134] followed by 3 each in 1965-66[135] and 1966-67[136] respectively. Nevertheless, no decision was taken to manufacture the military freighter (MF) version for a long time, (this was criticised by the Public Accounts Committee in 1966[137]), and as late as 1970-71, the proposal to manufacture the MF version was still under consideration.[138] However, a prototype was produced shortly after. Flight trials began in March 1972[139] and an order for 10 HS-748 (MF) was placed in 1975,[140] more than 10 years after production began.

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131 ibid., p.750.

132 SIPRI Yearbook 1973, p.365.

133 Jane's All the World's Aircraft 1977-78, p.84.

134 Report 1964-65, p.

135 Report 1965-66, p.46.

136 Report 1966-67, p.46.

137 Arms Trade with the Third World, p.750.

138 Report 1970-71, p.48.

139 SIPRI Yearbook 1973, p.365.

140 This was reported to have been chosen in preference to the Buffalo for which adequate credits were not available. See International Defense Review, 5/1975, p.766.

The first of these was scheduled to be ready by mid-1977,[141] and the production run of the HS-748 MF is expected to end by late 1977.[142]

HAL ALOUETTE III (SA316B) CHETAK

Production of the Alouette III helicopters began under the licence granted by Aerospatiale (France) in June 1962, and the first Indian assembled helicopter was flown for the first time on June 11, 1965,[143] but subsequently the program is reported to have falled considerably behind schedule as shown in the table below:

Alouette III Delivery Schedule:

	1964 - 65	1965 - 66	1966 - 67	1967 - 68	1968 - 69	1969 - 70	1970 - 71
First Plan	1	10	45	44			
First Modification	-	9	17	46	28		
Second Modification			15	32	49	16	
Third Modification				20	33	52	
Fourth Modification				8	12	30	36
Fifth Modification					4	12	18
Actual Delivery	4	7	4	-	-	-	-

Source: Arms Trade with the Third World, p.752.

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141 ibid. The MF version will also have the more powerful Rolls Royce RDa.532 engines.

142 David A. Brown, 'India's Aircraft Industry Grows', Aviation Week & Space Technology, January 7, 1977, p.15.

143 Jane's All the World's Aircraft 1977-78, p.83.

Production of Turbomeca Artouste IIIB 870 shp turboshaft engines commenced in 1965-66[144] and by mid-1972, HAL is said to have produced 85 helicopters.[145]

An armed version of the Alouette III, known as the Chetak, has also been developed by HAL. The Chetak carries 4 SS-11 Anti-Tank missiles on laterally mounted booms and preliminary trials are reported to have been successful.[146] It is a stripped down version, with its gross weight 350 kg less than the Alouette III, and a higher ceiling of 6,370m. compared to 4,250m. of the latter.[147]

HAL also supplies Indian built components, fuselage sections, doors etc. for French built helicopters.[148]

HAL (SA315B LAMA) CHEETAH

The Cheetah was designed in 1968 by Aerospatiale to meet Indian requirements for a high altitude helicopter[149] for use in the Himalayas, and uses the same powerplant as the Chetak. Agreement for its manufacture under licence

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144 Report 1965-66, p.46.

145 SIPRI Yearbook 1973, p.365. This figure appears to be on the high side since Jane's 1977-78 gives a total of 193 Al IIIs produced by January 31, 1977 (also confirmed by SIPRI Yearbook 1978, p.215). Since only 15 were delivered between 1964-65 and 1970-71, it would appear that 70 were produced between 1970-71 and mid-1972 and only 108 being produced during the period 1972-73 to January, 1977.

146 Jane's All the World's Aircraft 1977-78, p.83.

147 Flight International, February 22, 1973, p.264.

148 Refer n.146. See also SIPRI Yearbook 1973, p.265.

149 SIPRI Yearbook 1973, p.265.

in India was signed in September 4, 1970,[150] and a helicopter factory was set up, with an estimated capital expenditure of about Rs.344.4 million, the first Indian assembled Cheetah being test flown on October 6, 1972.[151] Production of helicopters manufactured from raw materials is reported to have begun in 1976-77[152] with a total of 50 delivered by January 31, and 16 more scheduled for delivery by end of 1977.[153]

HAL LIGHT HELICOPTER:

This successor to the Cheetah is being co-developed with Aerospatiale under the 1970 agreement. This high performance helicopter is to be powered by a 1030 KW Turbomeca Astazou XX turboshaft engine and two versions are being developed: a standard version for the Army/IAF with combat, communication, armed reconnaissance, rescue and training mission capability, and a naval version for anti-submarine, air-to-surface search and strike duties besides reconnaissance, replenishment and evacuation tasks.[154] No civilian version is planned.

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150 Report 1970-71, p.48.

151 Refer n.146.

152 ibid.

153 ibid. See also SIPRI Yearbook 1978, p.215.

154 Refer n.146. The project is reported to be at an advanced stage and 6 prototypes are to be built of which the first is due to fly in 1981. See also Aviation Week & Space Technology, March 13, 1978.

Overview:

Summing up, the experience of the aircraft industry in India has not been a very successful one. Most aircraft taken up for production, MiG-21, Gnat, HS-748, Cheetah and Chetak helicopters have been undertaken under licence arrangements. The same holds true of their power plants. HAL themselves have been able to develop the HT-2, a basic trainer, Pushpak and Krishak light aircraft, and HF-24 Marut and HJT-16 Kiran, a basic trainer. But even these have tended to depend on licence produced power plants, besides substantial import content in the form of various components. Contrary to initial expectations, the MiG project has not given the industry any significant experience in aircraft design and development. Another problem has been that the Bangalore complex has been loaded with too many projects which have not only resulted in spreading the resources too thin, but have also tended to retard progress. Also the lack of a sophisticated back-up industrial infrastructure has slowed attempts to progress towards self-sufficiency. Ancillary industries outside HAL have been virtually non-existent so far and consequently the Company has had to set up its own accessories production facilities, or rely on imports. Efforts at indigenisation have also met with very limited success, there being virtually no domestic capacity to produce strategic alloys and special metals.[155]

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[155] The indigenous content in the companies' 'raw materials, accessories and consumables' was 32 per cent in 1975-76. See Notes on Important Public Sector Projects of the Department of Defence Production 1977-78, p.2.

As a consequence aircraft produced within the country have tended to be more expensive than procurement from abroad, the increase ranging from 50 per cent to 90 per cent over imports.[156]

Planning of various projects has also left much to be desired. For example, the production run of the HF-24 Marut and HS-748 MF was scheduled to end in late 1977 and late 1978 respectively, but no alternative plans to utilise the available capacity seem to have been formulated so far.

As regards future plans, the Subramaniam Committee on Aeronautics, keeping in view the limitations of the industry, had made two recommendations:[157]

(a) A new advanced technology engine to be built around a proven engine (obviously imported).

(b) Indigenous design and development of an advanced technology engine to be undertaken simultaneously, to replace the proven engine eventually.

Subsequently, various plans to develop advanced technology combat aircraft 'rivalling the capability of America's Phamtom and France's Mirage'[158] 'comparable to any similar aircraft in the world'[159] to enter service in the 1980s have

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156 For a detailed discussion see Arms Trade with the Third World, pp.738-740.

157 Times of India, May 16, 1969.

158 Defence Minister Jagjivan Ram speaking in the Parliament as quoted in Flight International, January 14, 1971, pp.70-71.

159 The then Minister for Defence Production, V.C. Shukla's statement in the Parliament as reported in Times of India, April 26, 1974.

been repeatedly talked about, and if agreement for the import and eventual manufacture of the Jaguar aircraft is any indication, the earlier statements would seem to have been merely for public consumption. This is because the intention is to acquire a proven aircraft instead of only a proven engine!

BHARAT ELECTRONICS LIMITED (BEL), BANGALORE

Bharat Electronics Limited was established as a public sector company in April 1954 following a technical agreement signed with C.S.F. of France for technical collaboration in the manufacture of electronic equipment including vacuum tubes, components and radar. The factory, set up in Bangalore, commenced production 'on a small scale' in January 1956. The value of production and the types of equipment produced increased and diversified during the following years as a result of further collaboration agreements entered into with Pye Telecommunication Ltd. and Marconi of England, Philips of Holland, Siemens of Germany, Nippon Electric Company of Japan, Contraves of Switzerland and Radio Corporation of America. In 1964, further collaboration agreements were signed with Siemens of Germany and Radio Corporation of America for the manufacture of what was described as 'important defence communications equipment'.[160]

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160 Report 1964-65, p.58.